A Comparison of Economic and Participatory Approaches to Environmental Evaluation

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Declaration

I hereby declare that this thesis represents all my own work unless otherwise stated in the body of the thesis.

April 2001 Wendy Kenyon

Abstract

The use of economic valuation methods to inform environmental policy has become increasingly popular in recent years. In particular, the contingent valuation method, used to provide data to feed into cost benefits analysis, has proved particularly widespread. Despite this, a large body of literature has developed which has identified and detailed significant flaws in the contingent valuation method. In view of this literature, some researchers have begun to develop alternative means by which environmental projects can be evaluated, and to inform environmental policy. This thesis reports on research to develop this work by comparing two alternative but established methods of project evaluation, and one newly developed method in the context of a forest floodplain restoration project in the Ettrick Valley in the Borders Region of Scotland. The project aims to expand and create forest floodplain habitats whilst ensuring a partnership approach is maintained with the local community. The thesis evaluates the project using three distinct approaches. The first, an economic approach, uses the contingent valuation method to estimate the total economic value of the scheme. Results suggest that the project has a mean value of £13.18 per respondent, and a minimum aggregate value of approximately £450,000, as compared to an estimated cost of £335,000. The second approach uses participatory methodology - a Citizens' Jury. The Jury met to assess the project and to provide qualitative information to policymakers and concluded that the project was valuable to the community in a variety of ways, for example by protecting and maintaining flora and fauna, and by providing a resource by which people could learn about the natural environment. The final newly developed approach attempts to combine economic and participatory methods in a workshop scenario. First, participants were asked to complete a CV questionnaire. This was followed by structured discussion about the project, after which they were asked if they would like to revise their bid. This approach provided qualitative information comparable to the information provided by the Citizens' Jury, and quantitative information comparable to that provided by the contingent valuation approach. The mean WTP stated by respondents before the discussion (£11.07) was not significantly different from the mean WTP stated after the discussion (£13.59). This combined method allows the efficiency criterion and the community involvement element to be addressed in tandem. The thesis assesses the theory, implementation and results of the three methods in evaluating the floodplain restoration project. It concludes with recommendations on how this research can aid environmental policy, and how it might be taken forward to further enhance environmental evaluation.

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All remaining errors and omissions are my own.

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List of Abbreviations

BC	Budget Constraint
BFT	Borders Forest Trust
CBA	Cost Benefit Analysis
CJ	Citizens' Jury
CS	Compensating Surplus
CV	Contingent Valuation
CVa	Compensating Variation
DC	Dichotomous Choice
ES	Equivalent Surplus
ESA	Environmentally Sensitive Area
ESRC	Economic and Social Research Council
EV	Equivalent Variation
FA	Forest Authority
FWAG	Farm Wildlife Advisory Group
GDR	Grouped Data Regression
LGMB	Local Government Management Board
NOAA	National Oceanic and Atmospheric Administration
OAP	Old Age Pensioner
OE	Open Ended
OLS	Ordinary Least Squares
PA	Participatory Appraisal
PEV	Participatory Environmental Valuation
PRA	Participatory Rural Appraisal
RRA	Rapid Rural Appraisal
SEPA	Scottish Environment Protection Agency
SERAD	Scottish Executive Rural Affairs Division
SNH	Scottish Natural Heritage
SUI	Southern Uplands Initiative
SUP	Southern Uplands Partnership
TEV	Total Economic Value
TV	Television
UK	United Kingdom
US	United States
VA	Vickery Action
VW	Valuation Workshop
WTA	Willingness to Accept
WTP	Willingness to Pay
WWF	World Wide Fund for Nature

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CHAPTER 1

INTRODUCTION AND STRUCTURE

1.1 Introduction

It is widely accepted that consumer preferences should be taken into account in decisions regarding public resource allocation. Economists argue that these preferences are typically revealed through willingness to pay for goods and services in the market place. This may be relatively straightforward for goods which are traded in markets, but is problematic for non-market goods such as some environmental assets. Preferences for goods and services which traditionally do not have markets have been estimated via a number of environmental valuation techniques, based on revealed or stated preference approaches. Economic valuation methods such as contingent valuation (CV), travel costs and hedonic pricing have been used widely to evaluate the public benefits of environmental projects, throughout the world (Carson, 1994; Smith and Huang, 1993; Fletcher, 1990). However, because of the debate about such models, especially with respect to CV (Hausman, 1993), it is becoming increasingly clear that alternative approaches are potentially desirable. Some authors suggest that more deliberative project evaluation methods are required (Sagoff, 1998; Jacobs, 1997). It has also been suggested that projects are made more sustainable by the inclusion of local communities in all aspects of the decision making process (UN, 1993). These two arguments suggest the need for research into alternative project evaluation approaches that address moral and design problems associated with economic evaluation methods, and also allow deliberation and the participation of local communities in the process.

1.2 Objectives

The aim of the research is to design and test three approaches to the evaluation of one environmental project in the Borders Region of Scotland. One economic approach, using the contingent valuation method, one participatory approach, a citizens' jury (CJ), and an amalgamated approach, building on the strengths of CV and CJ, the valuation workshop, were selected. Specifically, the hypothesis is that economic and participatory approaches can be successfully amalgamated into a single approach that provides both economic estimates of the value of environmental projects, and qualitative recommendations provided by members of the local community participating in the evaluation process. In order to test this hypothesis, research has been conducted which aims to:

1. Estimate the economic benefits of an environmental project using the contingent valuation method;

2. Conduct a citizens' jury to provide qualitative data on the benefits of an environmental project;

3. Develop and test a framework for combining CV and CJ approaches;

4. Compare the theoretical underpinnings of each approach;

5. Compare the empirical evidence provided by each approach;

6. Offer recommendations on how such a combined method might best develop in future.

1.3 The Practical Context

A forest floodplain restoration project in the Borders Region of Scotland is the context for the three evaluation and decision support approaches. Forest floodplains have decreased significantly over the last two centuries in Scotland, the rest of the UK and Europe. In the last decade efforts have been made to arrest and even reverse this decline. The Ettrick Forest Floodplain Restoration project is one such initiative which aims to increase the area of forest floodplain habitat.

Chapter two provides a detailed background to the Ettrick project, and provides a practical context for the rest of the thesis. This chapter discusses the historical decline of forest floodplains, and provides full information about the Ettrick project in particular, including the location, the institutional structure and the costs and benefits of the project.

1.4 The Theoretical Context

The theoretical context for the thesis is discussed in chapter three. The thesis is based on the contention that problems with the CV method have lead to researchers looking to other means of project evaluation to support the decision making process. This search for alternative models has taken two distinct, but similar routes. First, researchers in developed countries have drawn upon the ideas of Arnstein (1969) who espoused increase public participation in policy making and the deliberative democracy theorists which have suggested that a move towards a more participatory rather than representative democracy is desirable. The citizens' jury is a practical approach which has grown out of these concepts.

Second, researchers in developing countries have also been searching for approaches which include local populations, local knowledge and increase the sustainability of development projects. The results of this search has been Participatory Rural Appraisal (PRA) and Rapid Rural Appraisal (RRA), both of which allow the input of local people into decisions that affect their lives. In this thesis the ideas of PRA and RRA have been drawn on the develop the valuation workshop as a project evaluation tool and means to support environmental decision making.

Chapter 3 elaborates on these theoretical concepts and sets the scene for the practical development of the CV, CJ and valuation workshop for the Ettrick Floodplain Restoration Project.

1.5 The Approaches

The contingent valuation methods has been used widely in recent years to provide decision support in the case of environmental projects and problems, and in particular to feed into cost benefit analysis. A huge literature has built up on the theory and design of CV and this is reviewed in Chapter 4. Chapter 4 also reports on the design, implementation and results of the contingent valuation survey carried out to estimate the total economic value for the Ettrick Floodplain Restoration Project.

Chapter 5 reports on the citizens' jury approach to environmental evaluation, building on the review of the theoretical context in Chapter 3. Details of the design and implementation of the CJ in the Borders to gather information on the Ettrick Project are provided. The chapter concludes with results of the Ettrick CJ, and an assessment of it's potential for future use in environmental evaluation and decision support.

Chapter 6 reports on an attempt to combine the strengths of the CV and the CJ methods into one evaluation approach – the valuation workshop. The theoretical rationale for such an approach is provided in Chapter 3, but chapter 6 offers details of the design of the valuation workshop and a report of the proceedings and the data collected. Analysis of the results, as appropriate for small sample sizes is also presented, and a comparison of the results of the valuation workshop results and the CV results on the one hand, and the valuation workshop results and the CJ results on the other. The chapter concludes with an assessment of the valuation workshop, and recommendations on how it might be adapted for future use.

1.6 Comparison of the Approaches

The final chapter compares all three approaches, assessing the theoretical and empirical merits and problems associated with each, both in general and with specific reference to the Ettrick Floodplain Restoration Project. Some shortcomings of the research are discussed along with recommendations on how to solve these shortcomings in further research. The research implies further research and this is also suggested in chapter 7. The thesis concludes with recommendations about how environmental evaluation methods might fruitfully develop to address the demands of modern environmental policy making.

CHAPTER 2

THE ETTRICK FLOODPLAIN RESTORATION PROJECT

2.1 Forest Floodplains

The context for the three approaches to environmental evaluation, is a forest floodplain restoration project in the Borders Region of Scotland. Floodplain forests have almost disappeared from temperate areas in Europe and North America. In Britain, most forest floodplains were cleared in pre-historic and early historic times (Peterken and Hughes, 1995). Until the eighteenth century some tracts survived on large rivers, but interventions by man in the early nineteenth century meant that much of the remaining floodplain forests were wiped out. Catchment management meant that flooding regimes were altered so that agriculture could take place on land previously prone to flooding. In Europe the few examples that have survived are often threatened by river regulation, power generation, pollution and intensified agriculture (Zinke and Gutzweiler, 1990; Peterken and Hughes, 1995). As well as ecological impacts associated with the loss of floodplain forests, other consequences include the acceleration of floodwaters to other (often populated) areas. For example, Zinke and Gutzweiler (1990) state that the manmade reduction of the forest floodplains in the early 19th century on the Upper Rhine, lead to a "flood danger four or five times greater than was the case before 1955" (p16).

Table 2.1 Characteristics of a forest floodplain

Strong zonation based on small differences in elevation (and therefore flooding)
Substantial diversity of forest type and ecotones based on diversity of site conditions
Mosaic of wooded and open habitat, with substantial tracts of poorly drained ground, and constant reworking of floodplain deposits by channel movements
Interactions between land and water, eg. Channel movement determine composition of forests, accumulation of logs and branches influence movement of water.
Patchworks of even aged stands associated with the channels

Adapted from Peterken and Hughes, 1995.

Ecologically the decline of forest floodplains is also significant. The characteristics of these areas outlined in Table 2.1 indicate that forest floodplains are one of the "richest components of the landscape" (Peterken and Hughes, 1995, p191). Dechamps *et al* (1987) prove that bird

species richness depends on the variety of vegetation types, and the fauna depends on the variety of food sources available. The richness of flora found in forest floodplain areas leads to a richness of wildlife inhabiting such areas. The forest floodplain is therefore important in protecting and restoring biodiversity. Restoration of forest floodplains may therefore go some way to maintaining or restoring biodiversity in suitable areas. In addition Petts (1992) suggests that restoration of forest floodplains might have a number of other benefits including timber production, reduction of agricultural surpluses, fishing, water quality and pollution control, river control costs and landscape benefits.

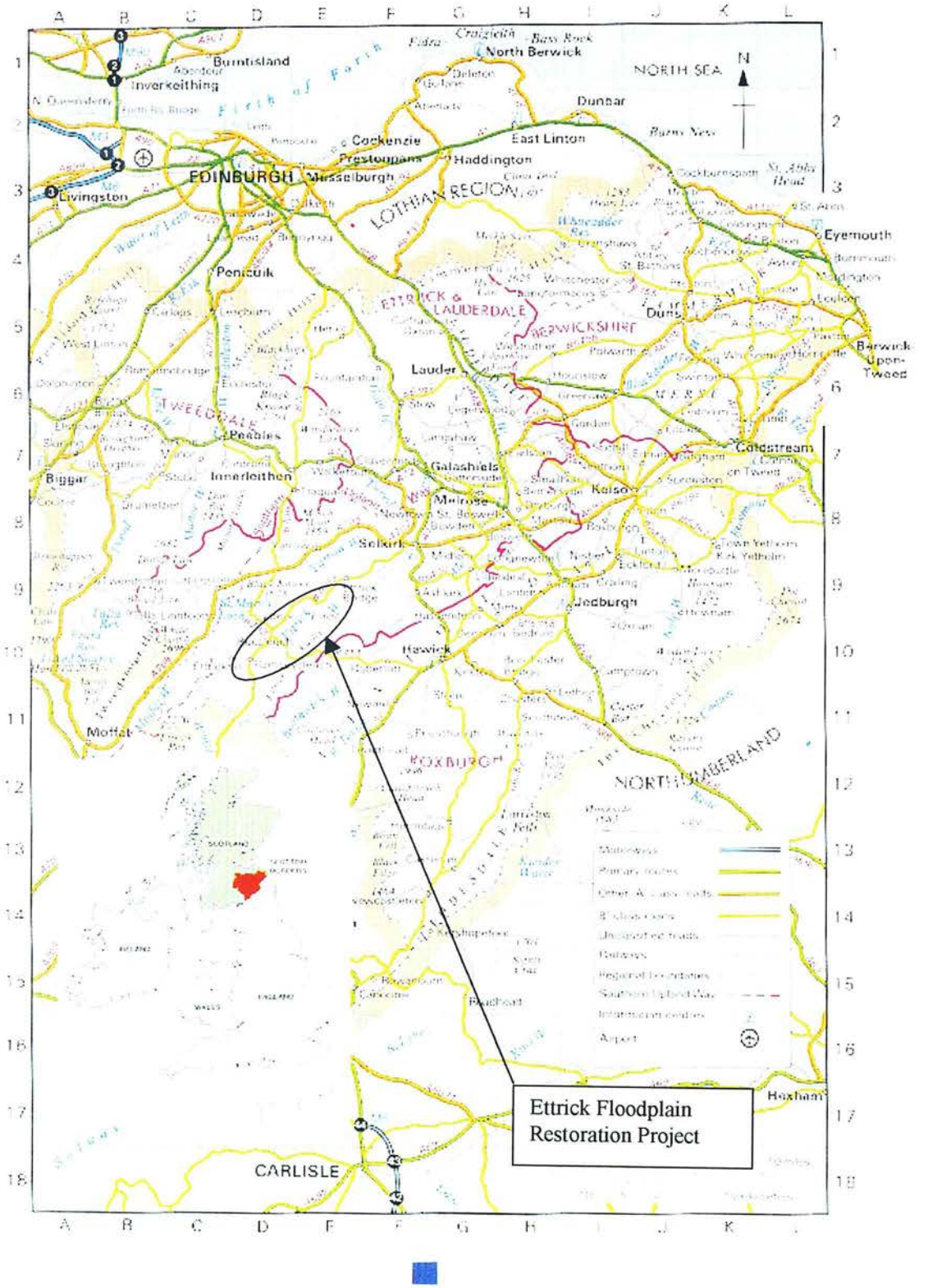
In the last two decades interest in conserving, restoring and expanding those areas of forest floodplain that have survived, has grown. In 1981 forest floodplains were the subject of a special study by the Council of Europe (Yon and Tendron, 1981). In 1982 the Council of Ministers passed a resolution that they should be protected (No. R(82)12). The World Wide Fund for Nature (WWF) launched a project to conserve central European floodplains in 1985, and ten years later, in 1995, WWF Scotland responded to concerns about the loss of floodplain forest habitats by commissioning a review of their status in Scotland. The study concluded that such habitats were scarce and under threat in Scotland (McGhee and Smith Associates, 1995). This study was followed by proposals for actions to restore floodplain forests (WWF, 1995).

2.2 The Ettrick Floodplain Restoration Project

According to Wood and Evans (1989) the decline in floodplain marshes has been severe and floodplain woodlands are a scarce habitat in Scotland. One of the most ecologically interesting areas of floodplain identified in the WWF review was on the Upper Ettrick in the Scottish Borders Region. The site consists of approximately a 4km length of the floodplain for the Upper Ettrick and Tima Water at an altitude of 228m. Figure 2.1 shows the location of the area. The Upper Ettrick area contains a variety of woodland, wetland and grassland habitats of nature conservation interest, including native broadleaved woodland willow car, sedge swamps, mixed fen vegetation and late cut hay meadows. The different habitats are distributed in a mosaic of small patches which results in high biodiversity for the area, including species that are recognised as locally and nationally scarce or endangered (Hannah, 1995).

Plants of interest include the North lady's mantle (*Alchemilla glomerulans*), tea-leaved willow (*Salix phylicifolia*) with many other willow species and their hybrids. Mammals recorded in the area include otters, badgers and red squirrels. The area hosts a range of overwintering and breeding birds including buzzard, sparrowhawk, tawny and barn owl. Kingfisher, sandmartin and dippers breed along the river, whilst oystercatcher, lapwing, snipe and curlew breed in the

Figure 2.1 The location of the Ettrick Valley – site of the floodplain restoration project



grassland. Woodland birds including greater spotted woodpecker and spotted flycatcher, reedbunting, sedge, grasshopper and willow warblers and willow tit are all recorded in the project area. Several rare moths are also present, (*Apotomis infida, Aphelia unitana, Nepticula ulmaria* and *Lampronia praelatella* amongst others) and further surveys are predicted to find more species of interest (Hannah, 1995).

The Upper Ettrick therefore shows great potential for the expansion of valuable habitat, utilising areas that are at present of limited conservation interest such as conifer plantation and improved grassland. Increasing the areas of valuable habitat would both protect the species that are already present and encourage others which would have been present in these habitats in the past. In partnership with Forest Enterprise, WWF, the Millennium Forest for Scotland and the local community and landowners, Borders Forest Trust is co-ordinating a habitat restoration project for the site. A Community Steering Group, and a Technical Steering Group including SNH, FA, FE, FWAG, SEPA, SOAEFD,[1] and the Tweed Foundation, provide the basis for a united approach to the project. The Upper Ettrick Habitat Restoration Project is the largest floodplain restoration project undertaken in Scotland to date. The project aims to:

- create 25 hectares of native woodland;
- restore 30 hectares of floodplain habitat, including scrub, fen, hay meadows and wetlands;
- convert 30 hectares of conifer plantation to native broadleaves;
- manage 15 hectares of willow scrub,
- and create 3 km of footpaths, boardwalks and tracks.

The aim of the project was therefore is to expand the number of habitats in the Ettrick Valley to promote biodiversity. Figure 2.2 shows the type and approximate percentage of each different habitat in the area before the project took place. The area is made up predominantly of grazing fields and conifer plantation, with some deciduous woodland and wetland. This can be compared with Figure 2.3 that shows the estimated percentage of different habitat types after the project is in place. Conifer plantation and grazing fields will decrease substantially, wooded wetland and haymeadow are introduced when neither was present before the project began, and deciduous woodland expands considerably and haymeadow expands slightly.

[1] Scottish Natural Heritage, Forest Authority, Forest Enterprise, Farm Wildlife and Advisory Group, Scottish Environment Protection Agency, Scottish Office Agriculture, Environment and Fisheries Department

Figure 2.2 Percentage of habitat types before the project

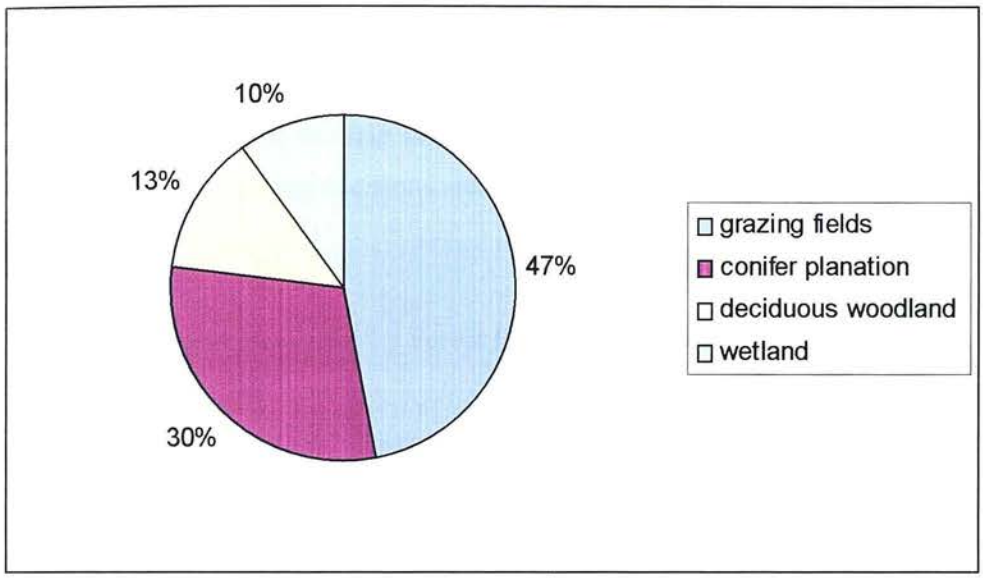
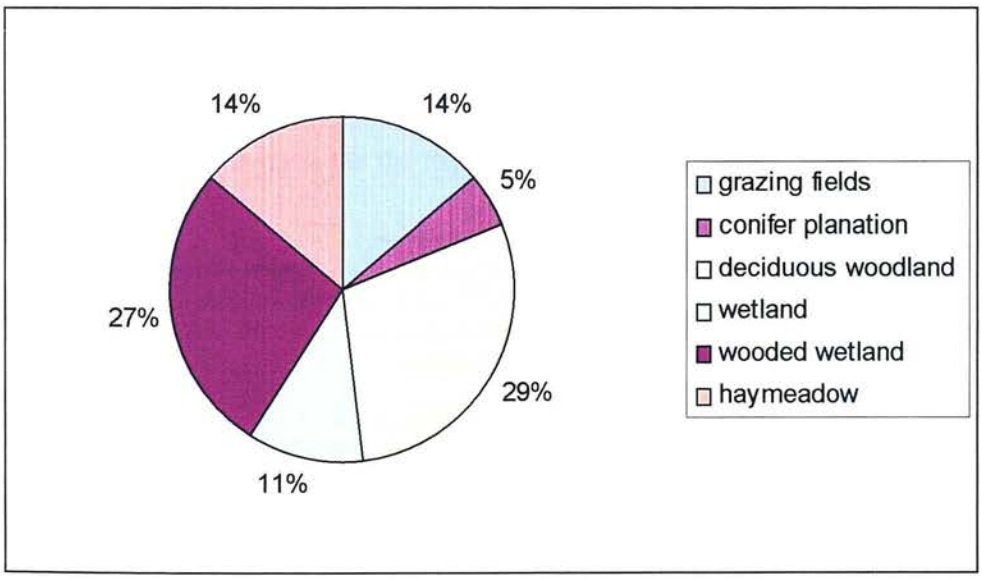


Figure 2.3 Percentage of habitat types after the project



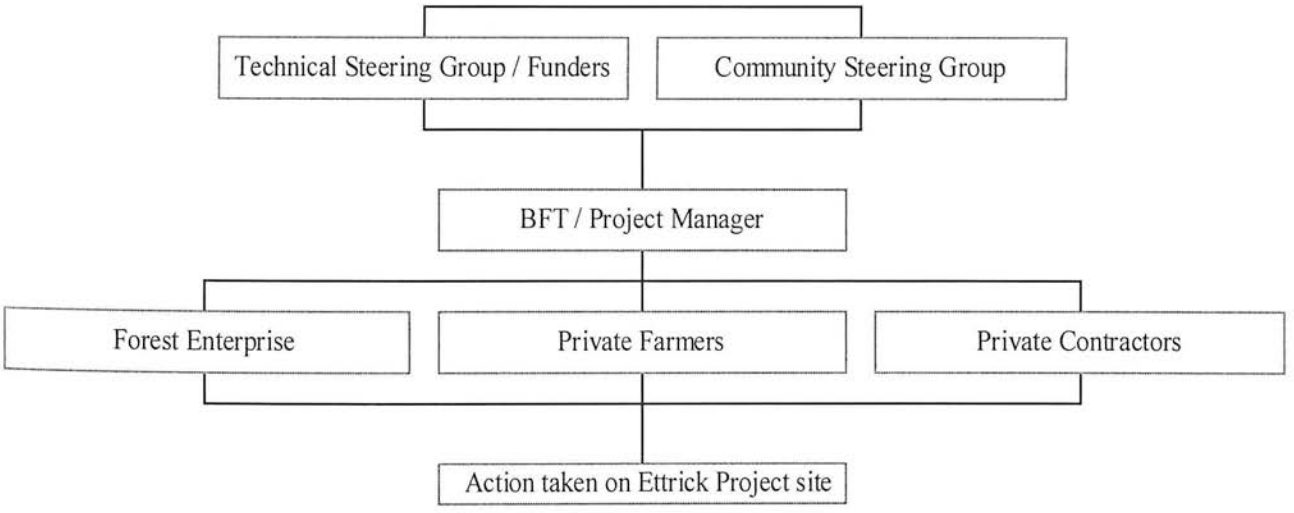
2.3 Management of the Ettrick Floodplain Restoration Project

Clearly the institutional context of the project area was important in the development of the project, and since the project site was and is still owned by a variety of different stakeholders, different agreements and structures were put in place in order to establish the project. Approximately 30% of the land identified as part of the project area was owned by Forest Enterprise and was planted with conifers. The remaining 70% was owned by 9 private landowners, comprising two remote land owners and seven owner occupiers using their land for farming. Figure 2.4 shows the stakeholders involved in the project, and how these were linked in the decision making process for the project. The technical steering group, was made up

mainly of funders who advised the BFT and the managers of the site on what should be carried out the site. The local community steering group represented the local community and were consulted on all aspects of the project, but in particular offered advise on issues such as most appropriate felling and burning times, public access issues and interpretation of the site. Both steering groups informed decisions made by the Borders Forest Trust and McBride Habitats, as managers of the project.

Decisions were implemented by Forest Enterprise, the local farmers or private contractors who would carry out for example, hydrological works on the project site. Each of the private landowners entered into a 25 year agreement, which gave BFT management control over land in the project area, in return for payments (Table 2.3). For example payments are made to farmers to manage their land for haymeadow. This involves late mowing of haymeadows, aftermath grazing and removal of stock at the request of the project managers. Farmers also receive payments for wetland management which involves moving stock at the request of project managers. Forest Enterprise also entered into a 25 year management agreement for land within the project area, which allowed BFT to make management decisions on that land.

Figure 2.4. Decision Tree for the Ettrick Floodplain Restoration Project



2.4 Financing the Ettrick Floodplain Restoration Project.

Although the land within the project area is therefore owned by a combination of private and public agents, the BFT obtained management control of the land within the project area. Funding for the project was co-ordinated by the Borders Forest Trust, and has come from a variety of sources. Table 2.2 shows each source and the amount contributed by that source.

Funding has been secured for the first 5 years of the project, and although the managers are aiming to make the project as sustainable as possible without large amounts of funding into the future, some commitment following the initial 5 years of the project is required. In total, £336,971.00 has been secured for the first five years of the project from a variety of local, national and international sources.

A breakdown of the costs of the project for the first 5 years are shown in Table 2.3. In the initial stages of the project a significant amount of monitoring and surveying of the site took place. Also in the initial stages felling of existing conifer plantation and planting of new broadleaf trees required significant amounts of money. In order to facilitate public access to the site, facilities such as car parks, footpaths and interpretation signs were needed, all requiring funding. However into the future much of the costs of the site relate to the management agreements with farmers, as discussed above.[2]

Table 2.2 Sources of funding for the Ettrick Floodplain Restoration Project

Source of Funding	Amount (£)
Forestry Authority – Woodland Grant Scheme	75,163.00
Forest Enterprise	12,000.00
Scottish Natural Heritage	20,317.00
European Funding	100,000.00
Millenium Forest for Scotland	91,521.00
World Wide Fund for Nature	36,259.00
Borders Tree Grant Scheme	238.00
Voluntary Contributions	31,473.00
TOTAL FUNDING	**366,971.00**

2.5 The Ettrick Floodplain Restoration Project as a Suitable Case Study

As a demonstration site, the Upper Ettrick habitat restoration project aims to provide educational and research opportunities for schools, colleges and other visitors. The provision of appropriate access and interpretation facilities will encourage sensitive use of the site by visitors. The managers of the project, the Borders Forest Trust (BFT) are keen to ensure that it is carried out in partnership with the local community. However, at the same time the BFT need to assure sponsors that the project adds value to the area, in terms of biodiversity, recreational opportunities and aesthetics. The project therefore appears to offer the ideal context to conduct the CV and CJ methods, and develop and test the valuation workshop approach to environmental evaluation.

[2] Currently, farmers are told when to move stock onto and off the site, however it is hoped that education of the farmers will mean

Table 2.3 Breakdown of costs for the Ettrick Floodplain Restoration Project

Project Costs	Amount (£)
Survey and Monitoring	
• Historical survey	553.00
• Biological monitoring and survey	2,970.00
• Vertebrate monitoring and survey	5,072.00
• Hydrological monitoring and survey	4,394.00
• Management plan	6,000.00
Tree Planting (including preparation, maintenance)	**56,942.00**
Felling	**53,715.00**
Fencing	**36,447.00**
Management payments	
• Meadow management	7,496.00
• Wetland management	6,000.00
• Hydrological works	21,499.00
• Other maintenance work	24,733.00
• Agricultural costs	16,268.00
Provision for public access	
• Footpath works/boardwalks	14,875.00
• Car park/bridge	18,735.00
• Sign posting	1,200.00
• On site interpretation	6,620.00
• Leaflets/publicity	2,028.00
Project Management	**44,455.00**
Other costs	5,496.00
TOTAL COSTS	**335,498.00**

that they will know when to remove stock from the land in future years, therefore decreasing the role of the project managers.

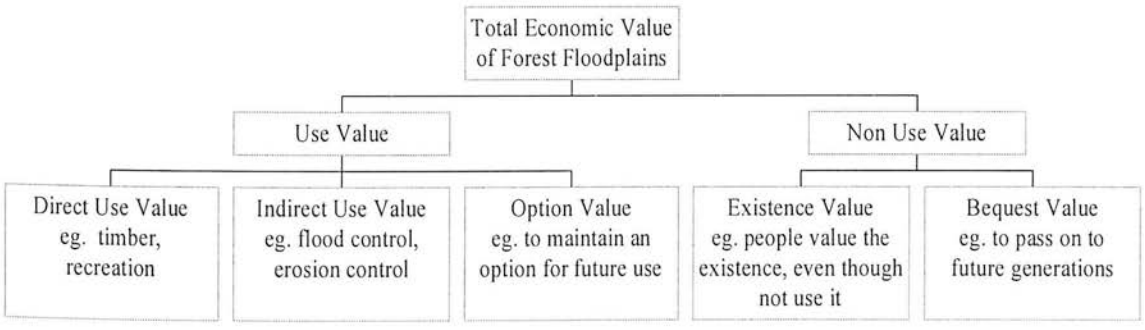
CHAPTER 3

THEORETICAL OVERVIEW

3.1 Introduction

The aim of economic methods of environmental project evaluation is to estimate the total economic value (TEV) of the environmental resource (Pearce *et al*, 1989; Johansson, 1987), where TEV is made up of both use values and non-use values. These values are all anthropocentric in nature, and are couched in terms of individual human preferences, where individuals are willing to pay for an asset so long as it satisfies a preference (Turner, 1999). Individuals are assumed to make choices that benefit themselves personally by enhancing their welfare. Environmental assets can satisfy wants by their direct use value, such as providing timber; and by their indirect use value for example, forests capacity for carbon storage or flood protection. Brookshire *et al* (1983) also identified option value which is a use value related to the amount individuals would be willing to pay to conserve an environmental asset for some future use. Wants may also be satisfied through what is known as non-use value. Bequest value is a non-use value, as people may value the floodplain not for their own use but so that it can be enjoyed by future generations. Existence value is also a non-use value and is illustrated by individuals being willingness to pay for the existence of certain species or natural environment, regardless of any use a person has for it. A typology of these benefits is presented in Figure 3.1. Economists argue that the total economic value of a resource such as a forest floodplain can be estimated in monetary terms using the contingent valuation method. Once calculated the monetary value of TEV may be used in a cost benefit analysis to evaluate the project and support decision making.

Figure 3.1. Typology of Total Economic Value



Environmental economists have long argued that TEV can only be estimated using stated preference techniques such as CV, where respondents to a survey are asked their willingness to

pay (WTP) for a carefully described environmental improvement, or to prevent some form of environmental degradation (Mitchell and Carson, 1989), or by their willingness to accept compensation for the degradation. Respondents to a survey are presented with a hypothetical situation, and asked how they would value changes from this situation. In general, the CV procedure consists of three components (Mitchell and Carson, 1989; Freeman, 1993). First, the environmental asset to be valued and change in it's quantity/quality is described to the respondent, and the hypothetical circumstances surrounding the asset explained. Second, the respondent is questioned about her willingness to pay for the asset being valued. And third data relating to the respondents' personal characteristics and preferences relevant to the asset are collected.

During the 1990's contingent valuation studies have been used to justify and inform environmental policy in the UK. Of particular relevance is a study by Bullock (1999) who estimated the value of the Environmental Sensitive Area policy in the Southern Uplands of Scotland (in the Borders), and found that the value to the public of such policies did justify the taxpayers expense. Hanley and Ruffell's (1993) study has also impacted on environmental policies in the Borders. They assessed the economic value of Forestry Commission forests in the UK, and found that the public did not value these forests for timber production alone, but also for their contribution to biodiversity, recreation and aesthetics. This provided justification for a long held policy of managing the forest for a variety of purposes, rather than for economic gain alone.

However, more recent literature has suggested that estimates of individuals TEV is not equivalent to the "true" total economic value of an environmental asset. Turner (1999) argues that the social value of an ecosystem is not the same as aggregated TEV because first, due to the complexity of ecosystems, indirect uses have yet to be uncovered and valued. Second, a range of values are dependant upon the existence of a healthy and evolving ecosystem which itself should be considered a primary value, but one which cannot be measured in conventional economic terms. Third, the value of an ecosystem is greater than the sum of it's parts, and value also relates to the structure of the system, holding everything together. Finally, a healthy ecosystem also requires a reserve, which can help the system deal with shocks and stresses. These four factors imply that TEV, as calculated by contingent valuation, is merely a part of the total environmental value of an asset.

Given these arguments, and the increasing literature highlighting flaws in the CV method (discussed in Chapter 4), it is unsurprising that there have been calls for environmental

evaluation methods to produce broader data on values and preferences, than the narrow economic estimates currently derived from CV studies (ESRC, 2000). These calls for alternative methods to deal with the flaws of CV, go alongside calls for increased citizen participation in the decision making process generally.

3.2 The Development of Participatory Methods

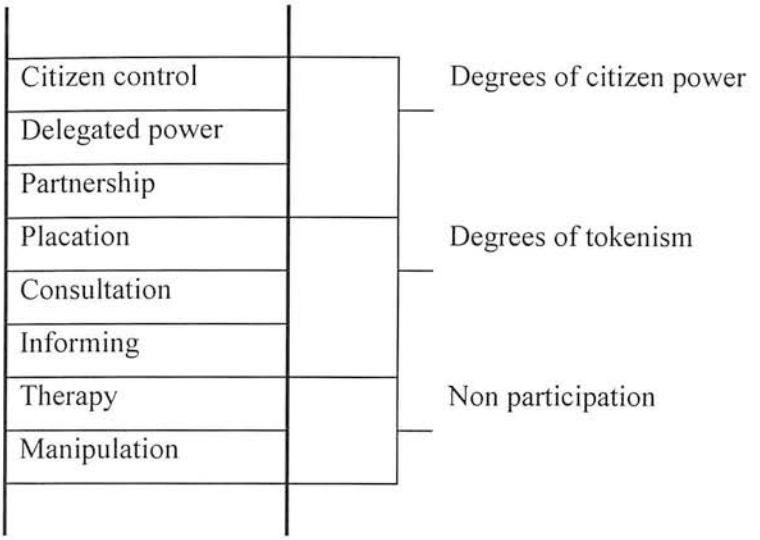
In recent years, the use of participatory approaches has proved particularly interesting to some researchers carrying out project appraisals and environmental evaluation, as an alternative to more traditional approaches. Participatory approaches may be defined as "a family of approaches and methods that enable local people to share, enhance and analyse their own knowledge of life and conditions. It facilitates their involvement in the planning, implementation, monitoring and evaluation of decisions and policies which affect their lives" (Chambers, 1992).

The increased interest in participatory approaches for project appraisal over the last 30 years seems to have two main influences. Interest in developed countries grew from theories of deliberative democracy and those who put such theories into practice, and the use of participatory approaches in developing countries in the early 1970's (Narayan, 1996; Chambers, 1995).

3.2.1 Growth in Participatory Theories in Developed Countries

Arnstein's ladder of participation (1971) provides a basis for the increased interest in participatory theories in developed countries. She defines participation as "the redistribution of power that enables the have-not citizens, presently excluded from the political and economic processes, to be deliberately included in the future. It is the strategy by which the have-nots join in determining how information is shared, goals and policies are set, tax resources are allocated, programmes are operated and benefits like contracts and patronage are parcelled out." (p176). She suggested that participation is a little like eating spinach – no-one is against it in principle because it is good for you. But that actually involving citizens in the decision making process is not a simple task. Her ladder of participation gives a typology of levels of participation (Figure 3.2) has become seminal in assessing levels of community involvement in the decision making process. Approaches which are higher on the ladder are deemed more sustainable and democratic. Approaches to environmental decision making which move up this ladder are potentially desirable.

Figure 3.2 Arnstein's ladder of citizen participation.



Theories of deliberative and participatory democracy have picked up on the themes in Arnstien's ladder and suggested ways in which representative democracies (typically found in developed countries) can improve the public involvement in decision making at all levels.

CJs are grounded in these theories of deliberative democracy (Smith and Wales, 1999; Stewart, 1994) or strands of these theories such as participatory democracy (James and Blamey, 1999) or discursive democracy (Dryzek, 1990). In simple terms these theories promote 'rule by the people' (James and Blamey, 1999). Dryzek (1990) sees discursive democracy as a solution to at least some of the world's political ills, in the face of current policy failure. He identifies on the one hand the limited ability of the market to deal with environmental, energy and welfare problems, but on the other hand argues that government intervention has little chance of succeeding in addressing these issues given the "widespread pessimism about the possibilities for effective public policy or planning" (p3).

Webler and Renn (1995) also identify failings of the current political system as the rationale for deliberative democracy. The current system of representative democracy is built on the notion that although citizens participate in the election of the political elite, which determine who governs them, they have no influence on the nature and substance of subsequent political decisions taken (Smith and Wales, 1999; Pickard, 1998). It is the decisions taken by these political elite which influences the lives and livelihoods of citizens, and yet, deliberative democracy theorists would argue that accountability for such decisions is lacking in current political environments – a dysfunctional democracy (Coote and Lenaghan, 1997). Indeed

Stewart *et al*, (1994) suggest that the citizens of this dysfunctional democracy are seen as customers, implying that members of the public should be content to choose from products or services provided by others, but have no role in either determining what those products and services might be, nor in how they might be delivered.

Fishkin (1991) is not surprised that the current political system is failing, as it has been adapted from a 2,500 year old democratic ideal. It originates from a system suited to a population of several thousands in a Greek city state, and is no longer suited to populations of many millions in the modern megastate. Fishkin argues that there are three essential conditions for democracy. First is political equality, without which some voices are not heard, or some votes do not count. Second is non-tyranny, where democracy is undermined if tyranny of the majority is in place. Finally, deliberation. Preferences should be formed on the basis of reflection and knowledge, to allow legitimate decisions to be made. Others have emphasised just two of these tenets, equality and non-tyranny or popular sovereignty as Webler and Renn (1995) call it. There is general agreement that a system which focuses on just one of these ideals provides a partial picture of what democracy is, and according to Fishkin can do as much harm as it can good.

The model which may deal with the current failure to address the problems expounded by Drysek (1990), Webler and Renn (1995) and Fishkin (1991), and which rests on the three tenets of democracy is known as participatory democracy. Participatory democracy emphasises debate and reasoning about and towards public interests, and actions in political communities of citizens who govern themselves, as opposed to private individuals governed by their representatives (Habermas, 1984). It is widely argued that such direct democracy (without representatives) is only applicable in small scale contexts, although others suggest that it may be possible to implement such direct democracy on a larger scale with institutions such as deliberative opinion polls (Fishkin, 1991), a global network of decision seminars (Lasswell, 1963 cited in Dryzek, 1991) or Q methodology[3] (Dryzek, 1991; Barry and Proops, 1999).

According to Smith and Wales (1999) deliberative democracy contrasts with contemporary liberal theory which holds that values and preferences are given and immutable, and the role of political authorities is simply to aggregate individual preferences to formulate policy decisions. Deliberative democracy on the other hand can be understood as a politics of transformation, in that political engagement and deliberation can lead to the transformation of values and

[3] Q methodology is a "qualitative but statistical approach to enable the discovery of a variety of discourses concerning how individuals understand their behaviour, and how they understand the social and environmental worlds in which they live." (Barry and Proops, 1999)

preferences based on ignorance and individuality to the development of well-informed, citizen orientated views.

Elster (1983) suggests that decisions based on the "thin theory of rationality" (such as CV) which requires only consistency in the expression of preferences, leads to unsustainable and inequitable choices. Where as decisions based on the "broad theory of rationality" which examines not only the consistency of expressed preferences, but also the beliefs and desires behind decisions, will be sustainable and equitable. He argues that decisions should be made by the public with "rational discussion about the common good, not the isolated act of voting to private preferences" (p35).

Habermas (1989) makes a similar argument and emphasises the importance of communication and "speech acts" in putting deliberative democracy into practice. He suggests that the purpose of communication is to build mutual understanding in order to construct a consensual social reality. Others have built on these ideas to suggest methods which allow such consensus to develop. Lasswell (1963, cited in Dryzek, 1991) suggested that a "decision seminar" might be a means of putting deliberative democracy into practice, and his ideas are perhaps the forerunner of the CJ. He suggested that the decision seminar would consist of a small group of 'committed' individuals engaged in direct communication in an information rich environment. Participants would be encouraged to disclose their ideas and accept criticism of them freely. Lasswell's vision saw each seminar as a long-term project, which was part of a global network of decision seminars.

The CJ appears to be an extension of this concept which upholds the ideals of deliberative democracy by promoting political decision making which encourages reasoned arguments and dialogue to resolve conflicts (Webler and Renn, 1995). A citizens' jury consists of a small group of people, selected to represent the general public rather than any particular interest group or sector, which meet to deliberate upon a policy question (Stewart *et al*, 1994). CJs are a practical tool by which this deliberative dialogue may take place so that citizens become more involved in the political process and thereby in decisions which affect their lives. In effect CJs promote the concept of the active citizen (Stewart *et al*, 1994), and can be seen as another approach (along with CV) that can be used to evaluate environmental projects and support decision making.

Despite the case that political theorists put forward for a means to facilitate the active citizen, and to rectify the failings of the current political system, it is interesting to note that practitioners of CJ and other deliberative forums would not have these methods *replace* the

existing democratic systems, but see them as enhancing and strengthening the democratic process, acting in a complementary fashion to other methods (Stewart *et al*, 1994; Tonn *et al*, 1993).[4]

3.2.2 Growth of Participatory Practices in Developing Countries

Whilst Arnstein was developing her ladder of participation in the United States of America, and the theories of participatory and deliberative democracy were being formulated, a number of researchers and practitioners were developing similar ideas in a developing country context. Chambers (1994a) argues that participatory approaches developed in low-income countries as a response to the circumstances of the time, and offers three reasons for their emergence. First, the growing disillusionment with the widely used process of questionnaire surveys, which were used to inform policy, but which many in development work considered to be unreliable. Second, what became known as development tourism, and third the recognition that a cost effective approach was required to learn about problems in developing areas.

Chamber's passage on the problems associated with questionnaires used to gather information for policy development is worth noting (1983, p53-54). "Exhausted researchers stare at print-outs and tables. Under pressure for 'findings', they take figures as facts. They have neither the time nor inclination to reflect that these are aggregates of what has emerged from fallible programming of fallible punching of fallible coding of responses which are what investigators wrote down as their interpretation of their instruction as to how they were to write down what the respondent said to them, which was only what respondents were prepared to tell them in reply to the investigators rendering of their understanding of a question and to the respondent's understanding of the way they asked it; always assuming that the an interview took place at all and that the answers were not more congenially compiled under a tree or in a tea shop or bar, without the tiresome complication of a respondent."

Evidence began to emerge which suggested that questionnaires did not produce reliable data upon which development policy could be based (Gajanayake and Gajanayake, 1993). The information from questionnaires often took months and even years to collect and collate, by which time the circumstances in a particular country might have changed significantly. Questionnaires, although perhaps acceptable in developed countries, were not common in developing countries and could be intimidating to local people. Finally, the custom of treating visitors as welcome guests, in many cases meant that respondents in developed countries went out of their way to agree with the interviewer, and try not to offend her, thereby not answering

[4] See Chapter 7 for a discussion of the complementarity of CJs and CV.

the questions properly. Questionnaires were therefore becoming seen as "tedious, a headache to administer, a nightmare to process, and write up, inaccurate and unreliable in data obtained, leading to reports which were long, late, boring, misleading, difficult to use, and anyway ignored." (Chambers, 1994c, p 956)

Second, what became known as rural development tourism was common place, where urban based professionals used brief visits to rural areas as a basis for development policy (Chambers, 1994c). It was widely held that such visits were fraught with anti-poverty biases as the true circumstances of the rural communities were often hidden from the visiting professionals. The timing and locations of visits frequently served to make the outside professional feel comfortable rather than to illuminate the poverty of the area. The elite's were often met rather than the poor or the socially disadvantaged, and in general such visits did not highlight the true situation and therefore did not form the basis for sound development policy.

Finally, Chambers (1994c) noted that new, more cost effective approaches to development, and project appraisal were being sought. The growing interest in indigenous knowledge and the acknowledgement that local peoples contribution to policies affecting their own lives could be extremely valuable led to an increased interest in approaches which encouraged local participation in the development process.

What was known as rapid rural appraisal (RRA) came out of this context. RRA acknowledges that trade-offs must be made between quantity, accuracy, relevance and timeliness of information collected. It combines a range of methods for rapid and cumulative data collection, such as semi-structured interviews, ranking and scoring exercises and mapping. According to Cornwall *et al* (1994) other key characteristics of RRA are that it is multi-disciplinary, it comprises a semi-structured yet flexible sequence that is reviewed and refined, and it explored local categories, classifications and perceptions.

Increased local participation in project development, design and evaluation was seen to have a number of benefits. First, it was felt that people's participation could increase the efficiency of development activities in that, by involving local resources and skills, better use could be made of resources. Second, local participation would ensure policies were better structured to local needs, as solutions would be based upon local knowledge and understanding of problems. Third, participation was thought to build local capacities and develop the abilities of local people to manage development projects themselves. Fourth, participation would increase coverage as local people would assume some of the burden of responsibility and thus help to extend the range of activities of a development activity. Fifth, participation was thought to

secure the sustainability of the activities as beneficiaries assume ownership and are willing to maintain its momentum.

As RRA developed to secure some of these advantages in development projects, researchers attempted to shift the focus from the rapid collection of data by researchers and planners to the researchers facilitating local people to generate, represent and analyse their own data. The label for this more participatory approach changed to Participatory Rural Appraisal (PRA). Participatory approaches (PA) that have developed out of RRA have adopted a different approach and researchers take the role of facilitators so that local people can generate their own information to from the basis for their own action. PRA involves similar methods to RRA, such as ranking and scoring, mapping exercises, focus group interviews and so on, but the emphasis is different (Cornwall *et al*, 1994). This divergence can be represented thorough what Chambers (1992) describes as the RRA-PRA continuum, to which questionnaire surveys can be added (Table 3.1).

Table 3.1 The survey/RRA/PA continuum

	Survey	RRA	Participatory
Mode	Extractive	Extractive	Empowering
Outsiders role	Investigator	Investigator	Facilitator
Information owned, analysed, used by	Outsiders	Outsiders	Local people
Methods used	Closed interviews	Semi-structured interviews; verbal interaction; secondary sources	Visual mapping and diagramming; ranking and scoring, transects

Adapted from Chambers, 1994a.

Questionnaire surveys can be placed at one end of the participatory continuum, as they offer extremely limited public participation, where as participatory approaches offer a high level of participation where local communities lead the process and conduct the analysis which will often lead to community action in some form. In between these two extremes has grown up a wealth of different methods (such as RRA) which include the public in decision making to a larger or smaller extent. The valuation workshop is built on the RRA model offering a decision support method which builds on the strengths of survey and participatory methods.

3.3 Criticisms of Participatory Approaches

Participatory approaches (PA) have been used successfully in the analysis, evaluation and support of policy decision in a wide range of situations, including the analysis of natural resource and environmental issues (Stewart, 1995; Scoones *et al*, 1992). Indeed, participatory approaches are becoming increasingly popular and although proponents welcome the expansion in their use, they also fear their abuse in developed and developing countries (Jiggins, 1994). As well as concern for the quality control of participatory approaches that comes from within, other criticisms have been voiced[5].

Much of the original objection to PA has been based on questions of rigour and objectivity. It was felt that the very things that characterised PA, such as flexibility, multi-disciplinarity, transparency, meant that the process would be subjective, and therefore invalid. However, some of the criticism on these grounds is dissolving, in part due to the increasing (although still quite limited) acceptance of qualitative data, and due to the results provided by PA, which have often proved to be the basis for successful policy and projects (Stewart, 1995; Scoones *et al*, 1992).

PA may also be criticised on issues related to sampling strategies and representativeness. In the past PA practitioners have not used the rigorous sampling procedures that economists and scientist would utilise, often just including those who turn up to a particular meeting (Inglis, 1990) As PA requires the involvement of as many members of the community as possible, trade-offs often have to be made between ensuring proper representation and the overloading of the research team in gathering the data (Bass *et al*, 1995). Despite this, it is possible to use PA within a rigorous sampling framework, and work has been conducted where sampling processes have been carefully considered such that the results could be extrapolated to wider surroundings (Mukherjee, 1995; Shah, 1997).

One problem that has perhaps hampered more widespread use of PA is its limited ability to provide large scale quantitative data. When quantitative information has been produced it has generally been small scale and localised (Scoones *et al*, 1992). Much economic and environmental policy is based on large scale quantified data, such as the data collected in most CV studies. PA has not traditionally provided this type of information. However, it appears that some within PA have acknowledged that certain institutions (currently still) require quantitative information, on which to base policy decisions, and that this data must cover large

[5] Since Citizens' Juries are a form of participatory approach, these criticisms also apply to them.

geographical areas and large numbers of people (Mukherjee, 1995). Evidence from practitioners and researchers using PA methods show that these issues are being tackled.

Although PA is not thought of as an approach which produces quantitative results, it is able to do so. The ranking and scoring techniques are particularly useful to this end. As PA's grow and adapt for use in more varied circumstances the number of techniques which generate such data has expanded. For example, Maxwell and Bart (1994) evaluate ranking and scoring techniques within the PA approach and develop methods which provide better (quantified) information about peoples preferences. Recent moves within PA, especially in India, have attempted to utilise PA in large scale surveys, and the limited evidence currently available seems to suggest that the approach may be successful in large scale data collection (Mukherjee, 1995; Chambers, 1994c).

Strategic behaviour may be a problem that PA practitioners face. As PA attempts to seek out problems and solutions from within local communities, it has been suggested that it may lead to policies and programmes that respond to the short term interests of participating individuals rather than the long term good of the whole, and that these people may act strategically in response to PA methods. However, there seems little empirical evidence in the literature as to the legitimacy of such concerns.

Richards (1995) argues that participatory approaches are a 'quick and dirty' anthropology on economists' terms. He refers to the fact that anthropologists have long recognised that understanding the dilemmas of the rural poor is very difficult, not least because of their exceedingly complex lives. If researchers (from any discipline) aim to gather data to reflect this complexity within a very short time, they cannot do justice to the issue. He argues that economists had just begun to accept the complexity of the issues and the need for long-term study in such areas, when PA appeared, providing a quick fix, so that such issues could be studied and assessed quickly and cheaply. Richards claims that this may be counterproductive.

3.4 Lessons for Environment Decision Support

Despite the criticisms shown above related to participatory approaches, there are clear parallels with the development of participatory approaches, such as PRA and RRA in developing countries and deliberative and particpatory democracy in developed countries, with new initiatives in the environmental valuation field (Ecological Economics Special Issue, 2000). Concerns about the reliability and accuracy of questionnaires used in CV have been noted for some time (Hausman, 1993), and the use of citizens' juries can be seen as a reaction against the

problems of using questionnaires in environmental evaluation. Although there are less analogies with the concerns about "rural development tourism" in developing countries, it is clear that incorporating local knowledge and participation in environmental projects is finding increasing support in order that projects be sustainable (United Nations, 1993). It is also clear from research funded by policy makers that they are keen to develop more cost-effective means of evaluating environmental projects (for example looking to benefits transfer).

The development of new approaches in the participation literature is not therefore dissimilar for the search for new approaches by some in the environmental decision support literature. The participatory continuum shown in Table 3.1 could be adapted into a typology of environmental decision support approaches as shown in Table 3.2. The CV in Table 3.2 being a form of survey, which is extractive, and used by outsiders. The citizens' jury being a participatory approach where ideally jurors are empowered and the outsiders act as facilitators. The valuation workshop from being a form of rapid rural appraisal, where the mode is still extractive, but the methods used are more participatory.

This call for new methods of evaluation which produce wider indicators of preferences and value is a response to some of the problems associated with CV. Sagoff (1998) comments that a constructive, deliberative and discursive approach can go a long way towards resolving technical problems that have complicated methods such as contingent valuation research. He suggests that a 'jury-like research method emphasising informed discussion leading toward a consensus based on an argument about the public interest' (p 213) may be particularly useful as an alternative or complement to contingent valuation. Gunderson (1995) also proposes that researchers should seek ways to create fair and open processes of group deliberation to enhance environmental valuation. Tonn *et al* (1993) go further and highlight the citizens' jury approach as a means to enhance the credibility of existing environmental valuation techniques.

Brown *et al* (1995) suggest the values jury as 'an alternative source of public value judgements that can potentially avoid some of the problems with the existing sources of public value judgements'. (p 251) Jacobs suggests that the value articulation institution should be public and deliberative in character and that citizens' juries might be useful in this regard (Jacobs, 1997). Common (1998) comments further that deliberative procedures such as citizens' juries could be used in environmental decision making and notes that 'they would not actually involve all that large a departure from what 'best practice' CV actually does, except that citizens' deliberation would replace consumers' preference revelation as the basis for an answer' (p 17).

Table 3.2 A typology of three approaches to environmental project evaluation

	Contingent Valuation (CV)	Citizen Jury (CJ)	Valuation Workshop (VW)
Time	20 minutes	3 days	3 hours
Sample size	660	11	44
Information provided	Limited information in the form of maps, pictures and text. Respondent has no opportunity to ask questions.	Large amounts of information presented by different stakeholders. Jurors can question witnesses, and ask for further information.	Limited information in the form of maps, pictures and text. Participant has opportunity to scrutinise and discuss information with peers.
Main benefits	Provides economic estimates Measures intensity of preferences	Participation of local community Deliberative in nature	Both economic estimates and recommendations Relatively inexpensive
Main pitfalls	Design problems Moral objections Accuracy	No economic estimates Representation	Quick and dirty Sample size Validity of output
Data elicited	Quantitative data on preferences Monetary valuation	Qualitative data on preferences Rankings of environmental characteristics Recommendation on policy	Quantitative data on preferences Qualitative data on preferences Rankings of environmental characteristics Monetary valuation

Citizens' juries provide one means by which the decision making process is supported and may be particularly useful in mitigating some of the problems relating to CV. Deliberative techniques such as focus groups and verbal protocols are already used by economists in designing CV surveys and in helping to interpret their answers (Hutchinson *et al*, 1996; Desvouges and Smith, 1988; Bullock and Kay, 1997). But CJs may go further in helping overcome some of the recognised problems in CV.

The NOAA panel on use of CV for damage assessment has referred to a number of these problems (Arrow *et al*, 1993) (these are discussed further in Chapter 2). One relates to respondent understanding: 'If CV surveys are to elicit useful information about willingness to pay, respondents must understand exactly what it is they are being asked to value' (Arrow *et al*, 1993, p 4605). Brown *et al* (1995) and Jacobs (1997) highlight the fact that many respondents do not appear to be well informed about the issues or the good to be valued. As Munro and Hanley (1999) show, changing people's information sets can be expected to change their willingness to pay for the environment. CJs tackle this problem by combining information, time, scrutiny and deliberation in the preference elicitation process (Coote and Lenaghan, 1997). They allow participants to question witnesses, discuss witnesses' evidence with other jurors, and thereby gradually learn about and reach a richer understanding of the issue (Sagoff, 1998). CJs therefore address the information problem better than CV.

CJs could assist in another area of debate relating to environmental preference revelation. Economists and others have suggested that a CV questionnaire asks respondents the wrong question, assuming that consumers think about environmental goods (public goods) in the same way they do about private goods (Blamey, 1996; Jacobs, 1997; Sagoff, 1988). Blamey (1996) suggests that respondents should not be treated as consumers of environmental goods, but rather as citizens who think of the welfare of the community when responding to environmental issues. In other words, individuals approach decision-making relating to environmental goods as citizens rather than consumers. Some researchers are already involved in research which aims to use a stated preference methods but asks respondents to think as citizens and not consumers (Russell *et al*, 1999). The use of CJs is another means by which respondents may be asked what Sagoff and Jacobs call "the right question", as it allows deliberation on the environmental issue in terms of what is best for society. Indeed, while the question for the jury *can* be framed in the context of individual consumer values and preferences if necessary, the approach of the CJ was developed specifically to determine opinions that represent the general public, rather than any individual interest (Coote and Lenaghan, 1997).

Citizens' juries may also be useful in dealing with equity and distributional issues which CV has trouble with. Economic value is effectively determined by demand, and demand is underpinned by ability to pay. Therefore, in CV, any value that a consumer places upon a good is not registered, unless she is able to pay for it. CJs however allow participants' opinions and preferences to be expressed and registered regardless of their ability to pay. Each juror can thus have an equal impact on the final recommendations (Crosby, 1995).

CV is not particularly well equipped to deal with the preferences of future generations, as current generations are asked what *they* would be willing to pay (although altruism for future generations, including ones own children, can be part of the motivation for WTP responses). This is especially problematic when dealing with certain environmental issues, where current action or inaction may have a significant impact on future generations. Brown *et al* (1995) have suggested that participants in a CJ can be asked to explicitly consider the welfare of future generations in their decision making process. Indeed, a Jury carried out for Waltham Forest Housing Action Trust explicitly considered the future when examining " what needs to be done by the year 2010 to achieve and maintain a good quality of life for residents in and around your neighbourhood?" (Office for Public Management, 1999).

CV may also be criticised on sustainability grounds, in that it does not include the participation of the community in a central way, since the United Nations Conference on Environment and Development (United Nations, 1993) suggested that environmental decisions would not be sustainable unless local communities participated fully in the decision making process. The use of CJs may be a means by which public participation can be more fully incorporated into environmental decisions. Indeed, Elster (1983) would argue that it is because CV is based on the "thin theory of rationality" which requires only consistency in the expression of preferences, that unsustainable and inequitable choices may be made. CJs on the other hand appear more consistent with the "broad theory of rationality" which examines not only the consistency of expressed preferences, but also the beliefs and desires behind decisions. He argues that decisions should be made by the public via "rational discussion about the common good, not the isolated act of voting to private preferences" (p35). CJs facilitate this rational discussion by which more equitable and sustainable decisions might be made.

Finally, the notion of value construction suggests that respondents do not have well-defined preferences for many complex policy options prior to elicitation, but that these preferences are constructed during this process. The way in which people construct their preferences is important as decision makers should attach more weight to the preferences of someone who

knows both sides of the argument, than to someone who's knowledge of the problem is more limited (Elster, 1983; Sunstein, 1990). According to Elster (1983) however, many methods which explicitly try to determine how people construct their preferences (for example by aiding value construction) are likely to be contradictory – akin to telling someone to "be spontaneous"! However, CJs provide information about the process of preference construction as a by-product of the process rather than as a central role. Therefore, using CJ may offer a means of circumventing the contradiction inherent in helping respondents construct their values, and provide information to decision makers on what weight should be given to the preferences expressed. These arguments clearly illustrate the potential that citizens' juries offer in evaluation of environmental projects.

Despite the advantages that CJs appear to have over CV, CJ's do not provided an economic estimate of the value of any particular project, nor whether it constitutes an efficient use of resources. Randall (1999) has suggested that despite the problems related to valuation methods it is useful to retain some form of cost benefits analysis in environmental decision making. A third method therefore seems potentially desirable, which allows deliberation, participation, and produces broader indicators of value, but which also estimates total economic value for inclusion on CBA. Such a method might aim to combine aspects of CV with aspects of a CJ, and provide both qualitative data and economic estimates in the environmental project evaluation. The contingent valuation method and the citizens' jury approach to elicitation of public opinion are at opposite ends of a spectrum (Table 3.2). However, an approach that falls between these two extremes may build on the strengths of CV and CJ, and provide an alternative, or at least a complementary means of evaluating environmental projects. The "valuation workshop" combined elements of the economic approach and the participatory approach. It allowed deliberation and social interaction in the discussion of the Ettrick Project, but also included a contingent valuation questionnaire. The output consisted of both narrow economic estimates of willingness to pay for changes brought about by the project, and broader indicators of preferences and values related to the project.

Table 3.2 provides a typology of each of the approaches, showing the differences in information provided, data elicited, and advantages and disadvantages of each. Clearly more deliberation means that more time is required, and due to resource constraints, a smaller sample size is involved. There is thus a trade-off between the degree of deliberation and participation and statistical representativeness. However, it is argued that depth and richness of response may compensate for small sample sizes (Crosby, 1995; Gregory *et al* 1997; Jacobs, 1997). Each approach has potential benefits and pitfalls, and each has the potential to offer different, but

equally policy relevant information. The research will assess each method and compare the relative merits of each.

CHAPTER 4

CONTINGENT VALUATION

4.1 Introduction

Cost benefits analysis grew out of work by Dupuit in 1844 when he simulated market conditions in studying capital projects such as the building of roads and bridges. Since then economists have widely used simulation exercises to assess the allocation of resources in the presence of market failure (Arrow, 1999). Contingent valuation (CV) has grown out of this and aims to quantify the benefits of non-market goods and services so that they may feed into cost benefit analysis (Bateman and Willis, 1999).

Since the first use of CV in the 1960's, studying outdoor recreation in the US, the popularity of the method has increased dramatically (Hanneman, 1992). Key in the development of the CV method were events surrounding the Exxon Valdez case. The Exxon Valdez oil tanker was grounded in March 1989 and spilled 11 million gallons of crude oil into the waters of Prince William Sound, Alaska. This caused the largest oil spill in US waters, with Exxon being sued for losses, for example to fishermen, for restoration of the natural ecosystem and loss of non-use values. Contingent valuation was used to estimate the lost non-use values from the oil spill. A group of economists was commissioned to carry out a CV to be used by the state of Alaska in litigation against Exxon. State of the art CV research was utilised, and the conclusion was that passive use values that ranged from 2.81 - 9.33 billion US dollars (depending on the precise CV model used) were lost as a result of the oil spill. Not surprisingly, Exxon were not best pleased with these results and attempted to discredit the CV technique. A number of papers critical of CV were presented at a conference held in Washington in 1992 (Hausman, 1993).

It was left to the National Oceanic and Atmospheric Administration (NOAA) to determine whether CV was an appropriate means by which to assess judicial damages in such cases. NOAA appointed a panel of economists and non-economists to evaluate CV as a method of natural resource damage assessment. This panel stated that CV was a tool which could produce estimates reliable enough to be the starting point of a judicial process of damage assessment (Arrow, 1993). The panel produced a number of guidelines which, if followed, would ensure that CV results would be valid for use in assessing judicial damages in a court in the US. These will be discussed below.

Since the early 1990's when this took place, CV has become increasingly popular, and is used widely all over the world to inform environmental (and other) decision making. This chapter reviews the CV method and reports on two CV studies conducted on the Ettrick Floodplain Restoration Project. The chapter begins with a discussion of the theory in section 4.2, and in section 4.3 goes on to review design issues associated with CV. The literature on CV is huge and this review has therefore had to be selective. The design of the CV of the Ettrick is discussed in section 4, with the statistical treatment of the data presented in section 4.5. Section 4.6 presents the results of the CV studies. The results are discussed and the chapter concluded in section 4.7.

4.2 The Theory

Contingent valuation is grounded in the theory of welfare economics, which attempts to measure the welfare change that results from the improvement in (or deterioration of) some environment asset. If a beneficial change occurs and if a person derived utility from that change, a rational actor will be willing to pay to ensure that change takes place. If the initial state is preferred to the new state, the person may be willing to accept compensation in order to accept the change. Freeman (1993) suggests that environmental quality can affect individual welfare via four means: changes in the price individuals pay for goods in the marketplace; changes in the prices they receive for their factors of production; changes in the risk that an individual might face; and changes in the quantities or qualities of non-market goods. It is usually the last of these that is estimated using the contingent valuation method.

Three assumptions and four axioms should be noted when estimating the change in welfare brought about by any of the above situations (Boadway and Bruce, 1984). The assumptions state that individuals are the best judge of their own welfare; that an individual will always prefer more to less of a good, other things being equal; that there is substitutability between bundles of goods and services individuals want, so they are able to make trade-offs. The first of the four axioms is reflexivity, that any bundle of goods and services is at least as good as an identical bundle. The second, completeness, that an individual can always compare and rank two consumption bundles, and can always make a choice between two bundles. Third, transitivity, that if an individual prefers bundle A to bundle B, and prefers bundle B to bundle C, then by assumption he prefers A to C. Finally, continuity, that there is no necessary level of one good, implying that trade-offs can always be made (Varian, 1993).

Given these axioms and assumptions an individuals preferences can be described in terms of a utility function

$U = U(X,Q)$

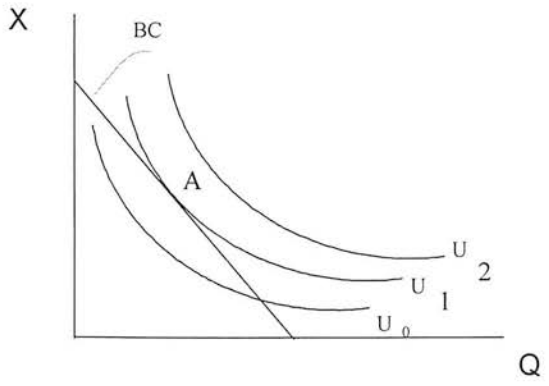
where utility (U) is a function of a vector of private goods and services (X) and a vector of environmental goods (Q). The individual will aim to maximise utility, but is constrained by income

$Max\ U = U(X,Q)$

$Subject\ to\ \Sigma X.\ P \leq M$

where the constraint is determined by the sum of all private goods and services multiplied by their price (P), which is equal to money income (M). This is shown in Figure 4.1 where the consumers utility is shown by indifference curves (U) which are determined by the level of X and Q available. The consumer maximises consumption of X and Q subject to the budget constraint (BC) at point A on U_1, where the indifference curve is at a tangent to the budget constraint.

Figure 4.1 Indifference curves and a budget constraint



The solution to the utility maximisation problem gives a demand function conditional upon an imposed level of Q, where

$X = X(P,M,Q)$

demand for X is a function of prices, money and environmental quality. The indirect utility function is derived by substituting the demand function into the utility function.

$V = V(P,M,Q)$

From this, the expenditure function is the dual of the utility maximisation problem and is the minimum expenditure on market goods required to achieve a certain level of utility (U_1).

$E(P,Q,U_1) = Y$

where Y is the minimum amount of money needed to obtain U_1 utility level given prices of private goods and the level of environmental goods.

If P_0, Q_0, U_0 and Y_0 are initial levels of prices, environmental services, utility and income, a compensating surplus (CS) measure of a change in utility can be derived following a change in environmental services from Q_0 to Q_1 as the maximum amount (that is an income reduction) that the consumer would be willing to pay in order to gain the increase in environmental services and still be at the original level of utility (Mitchell and Carson, 1989). CS assumes that the consumer is entitled to the current level of utility or the initial endowment of property rights. From the expenditure function CS can be defined as:

$CS = E(P_0,Q_0,U_0) - E(P_0,Q_1,U_0)$

$CS = M - E(P_0,Q_1,U_0)$

From the indirect utility function CS can be written as:

$v(P_0,M,Q_0) = v(P_0,M-CS,Q_1)$

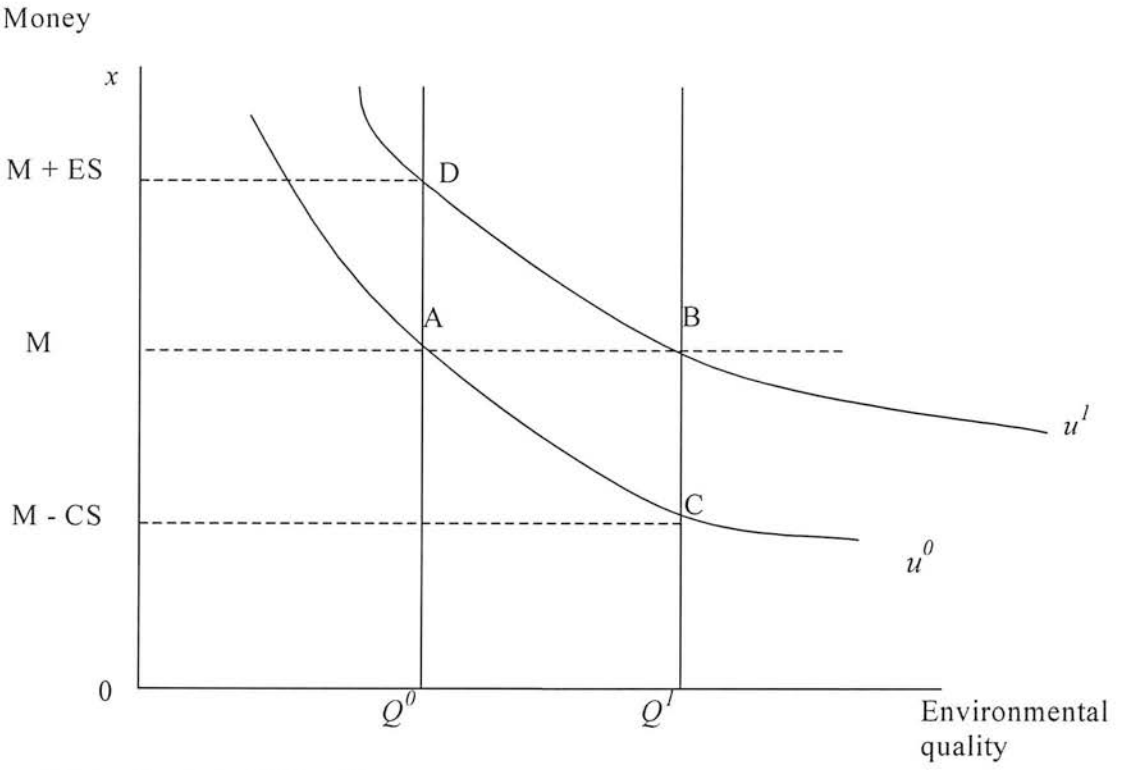
In Figure 4.2 compensating surplus is shown for an increase in Q from Q_0 to Q_1. Assume the consumer begins at point A on indifference curve U_0, with 0M level of goods (or money) and Q_0 level of environmental services. An increase in environmental services from Q_0 to Q_1 would increase utility as the consumer would move onto U_1 (point B). In order to secure this increase in environmental services the consumer would be willing to pay BC, which would leave her just as well off as before the environmental services increase.

An alternative measure of welfare change equivalent surplus (ES), assumes that the consumer is entitled to an alternative level of utility, or a different set of property rights to those initially held. From the expenditure function ES can be defined as:

$ES = e(P_0,Q_0,U_1) - e(P_0,Q_0,U_0)$

$ES = e(P_0, Q_0, U_1) - M$

Figure 4.2 Compensating and equivalent surpluses for changing environmental quality



Source: Freeman, 1993, p78.

From the indirect utility function ES can be defined as:

$V(P_0, M-ES, Q_0) = v(P_0, M, Q_1)$

Equivalent surplus can therefore be defined as the minimum amount of income a consumer would accept, to forgo an increase in environmental service, which would put her on a new level of utility (that is her willingness to accept). ES is also represented graphically in Figure 4.2. The consumer starts with Q_0 and M at point A. A proposed increase in environmental services to Q_1 would increase the utility to U_1 at point B. The equivalent surplus is the amount the individual would accept in compensation to forgo the increase in environmental services, but be at the new level of utility (AD).

Table 4.1 The relationship of WTP and WTA with compensating surplus and equivalent surplus

	Willingness to pay	Willingness to accept
Increase in environmental services	Compensating surplus	Equivalent surplus
Decrease in environmental services	Equivalent surplus	Compensating surplus

Adapted from Mitchell and Carson (1989, p25)

Table 4.1 shows how the compensating surplus and equivalent surplus measures are related to willingness to pay and willingness to accept. Compensating surplus is used when the consumer is entitled to the initial endowment of property rights. Equivalent surplus is used when the consumer is entitled to a new set of property rights.

Related to these measures are two other measures of welfare change: compensating variation (CVa), equivalent valuation (EV). Compensating variation and equivalent variation are closely related to compensating surplus and equivalent surplus, but they allow the individual to adjust the quantities of both bundles (ordinary goods (M) and environmental goods in this case). The surplus measures are more useful in the measurement of welfare changes associated with environmental goods as they place restrictions on the individuals consumption, for example so that an individual can only choose between two levels environmental goods.

CVa, EV, CS and ES are theoretical refinements of the consumer surplus measure of welfare change. Consumer surplus was defined by Marshall (1920 p124, cited in Freeman, 1993, p46) in the following way. "The individual derives from a purchase a surplus of satisfaction. The excess of the price which he would be willing to pay rather than go without the thing, over that which he does actually pay is the economic measure of this surplus of satisfaction. It may be called consumer surplus." Consumer surplus is based on the ordinary demand function and can be directly observed for marketed goods. This measure of welfare change is therefore used in revealed preference methods of environmental valuation. Consumer surplus has been shown to be a non-unique measure of welfare change due to path dependence problems (see Johansson, 1991). Stated preference valuation methods are therefore the only methods which are able to use the theoretically correct measure of welfare change. However, in practice, as discussed below, the measure to estimate WTP is almost always used, whatever the theoretically correct measure.

4.3. Review of Design Questions

As the popularity of the CV method has grown, so has the literature on the most appropriate design of the process. A wide range of issues relate to how the questionnaire should be designed, the amount of information that the respondent should be given, and the validity of different variations. The literature on a number of these design issues related to this research is reviewed below, with a view to assessing the current state of the art in CV design.

4.3.1 Information Provision

The amount of information provided to CV respondents is crucial, as, according Munro and Hanley, (1999) "the values individuals attach to goods depend on the information available to them" (p 258). Researchers have become more adept at conveying information to respondents in questionnaires, and a number of formats are available to them. Researchers may question people who already visit a particular site, (Edwards-Jones, 1995), and often use photographs (Whitehead *et al*, 1995), slides and video footage (Samples *et al*, 1986), or computer images of the environmental good before and after the change. With advances in technology, supplying information has become simpler, and more accurate, but the level of information that should be offered is still unclear.

A number of studies have tried to assess the impact of different levels of information on respondent's WTP. Table 4.2 shows results from selected studies, many of which suggest that provision of different levels of information does impact on the WTP bid in a CV survey.

Munro and Hanley (1999) suggest that the impact of information on WTP may depend on the type of benefit in question. In general, when use values are being estimated, and where users are the respondents, as they have already decided to enjoy the good, and may already have to pay, increased information is less likely to be significant. When existence values and use values are being elicited it is more likely that more information will increase values (Samples, 1986; Hoevenagel and Linden, 1993). Providing information on substitutes or complements is likely to decrease and increase bids respectively (Whitehead and Blomquist, 1991).

Despite these findings on the impact of information on WTP, it appears that too much information can confuse the respondent, thereby revealing meaningless valuations. Whitehead *et al* (1995) argue that better information leads to more reliable and valid WTP bids. However, 'better' does not necessarily mean 'greater'. They find that validity and reliability of CV may depend on the way in which the respondent has become informed about the asset to be valued.

Table 4.2 The impact of different levels of information of WTP

Study	Good	Information	Results
Bergstrom & Dillman, 1985	Prime farmland (US)	2 groups: 1st group told of environmental services of land; 2nd group, no information on environmental services.	Mean difference of $5.29. Significant at 99% level.
Samples *et al*, 1986	Humped backed whale (US)	2 groups: 1 group shown film on whales, control shown film on making TV adverts.	Both groups increased WTP, but no significant difference.
Boyle, 1989	Trout fishery (US)	3 groups provided with: basic; basic and current stocking activity; basic and current stocking activity and costs.	No significant difference in estimate, but variances fell, and percentage of zero bids fell with increased information.
Bergstrom, 1989	Recreation in wetlands (US)	2 groups: control; control plus information on daily catch, scenery and isolation	Positive change in mean, significant at 99% level.
Boyle *et al*, 1991	Hunting (US)	2 groups: Control; control plus information on price of substitutes.	No significant impact.
Whitehead & Blomquist, 1991	Wetlands (US)	4 groups: information on substitute and complementary goods.	$5.81 fall in bid when substitute information given. $5.71 rise when complement information given.
Hanley & Munro, 1992	Heathland (UK)	4 groups: control; site-specific; endangered habitat; all.	Positive impact, but dependent on bid vehicle.
Hoevenagel & Linden (1993)	Clean environment in 2015 (Holland)	3 groups: Control; information on environmental issues; information on 7 issues.	Significant impact on WTP and on protest bids.
Brunson & Reiter (1996)	Forest Management (US)	2 groups: control; message about ecosystem impacts.	No significant difference.
Kenyon & Edwards-Jones, 1998	Four sites within parkland (UK)	Six groups given increasing amounts of information.	Groups with most information corresponded with expert ranking of the four sites.

Adapted from Munro and Hanley (1999)

Respondents who have become informed about the environment through on site use of the asset may provide more reliable bids (where reliable means more predictable) than those who are informed through off-site use, who in turn are more reliable than those respondents who attained their information from the survey itself. This result is confirmed by findings of Kenyon and Edwards-Jones (1998) who found the ranking of WTP responses from respondents who had visited four sites, corresponded to the rankings of expert opinion, as opposed to respondents who had not visited the site, whose ranked WTP bids appeared more random.

Grether and Wilde (1983) introduced the concept of weak information overload which suggests that although information does affect preferences, this effect diminishes at successively higher information levels. Hoevenagel and Linden (1993) show evidence of this threshold in their work, and Hanley and Munro (1993) also note such a threshold, suggesting that it may be likened to the effect of advertising on the consumer, where a certain critical mass of advertising must be evident before consumers respond. Sagoff (1988) argues that "full" information is required for the respondent, but does not state what exactly full information is[6].

Ajzen *et al* (1996) find that providing respondents with detailed information may not offer a satisfactory solution to such problems. Respondents may fail to assimilate information, especially in cases of lack of prior knowledge of the subject and low personal relevance. Hutchinson *et al* (1995) also note that more information does not necessarily lead to more accurate WTP, and as the good gets more complex, bids may become more random. Indeed it has been suggested that the provision of full information is sub-optimal as the marginal cost of acquiring and supplying it may be less than its marginal social value (Munro and Hanley, 1999).

Evidence therefore seems to be conflicting, and the optimal level of information to provide in a CV study remains unclear. Perhaps the level of information required to be presented to a respondent to a CV survey lies within a certain range. This range might be above the information threshold identified by some (Grether and Wilde, 1983; Hoevenagel and Linden, 1993; Hanley and Munro, 1993), and below the "full" amount suggested by Sagoff (1988).

4.3.2 Willingness To Pay and Willingness To Accept

A second issue which has proved contentious in CV studies has been the use of willingness to pay or willingness to accept in the valuation question. Mitchell and Carson's (1989) advice on which measure to use seems simple at first sight. "Whether an elicitation question in contingent valuation is phrased in terms of willingness to pay or willingness to accept depends on which

consumer surplus measure the researcher wants to obtain. The choice between the WTP or WTA formulation is a question of property rights: does the agent have the right to sell the good in question or, if he wants to enjoy it, does he have to buy it?" (p30). This implies the decision is based solely on property right issues.

This advice appears acceptable as, according to welfare economic theory, the two measures should be the same. Any small difference between them might result from a very small income effect (Willig, 1976)[7]. However, evidence from a range of studies shows the WTA amounts often substantially exceed WTP amounts (Cummings *et al*, 1986; Knetsch and Sinden, 1984; Coursey *et al*, 1987; Knetsch, 1990). Indeed, Brown and Gregory (1999) report on 23 studies, and show that the ratio of WTA against WTP ranges from 1.4 (Eisenberger and Weber, 1995) to 61.0 (Brookshire and Coursey, 1987).

The disparity was first uncovered in a study by Hammack and Brown (1974, cited in Brown and Gregory, 1999) who found WTA compensation for waterfowl hunting was over four times greater than WTP for the same benefits. Following this, a number of other empirical results showed the same phenomenon (See Brown and Gregory, 1999 for more studies). It was not just the difference between WTP and WTA that aroused interests, but also that there appeared to be more protest bids with WTA questions (Mitchell and Carson, 1989).

Initially the WTP/WTA disparity was put down to the hypothetical nature of contingent valuation studies, but this was soon refuted as the results of controlled experiments and of real buying and selling behaviour also, on the whole, showed large differences between WTP and WTA (Knetch and Sinden, 1984; Bishop and Herberlein, 1979). After a large number of studies had confirmed the disparity, research moved towards trying to explain why it might exist.

Mitchell and Carson (1989) suggested that the explanations can be classified into four categories: rejection of the property right; the cautious consumer hypothesis; prospect theory; and "others". The suggestion that respondents reject the property right implied in WTA questions comes from the fact that CV studies using the WTA format have often had a very large number of protest bids, i.e. 50% or more (Mitchell and Carson, 1989). Those who protest in response to WTA questions may feel that the property right is implausible and/or illegitimate. This may be related to the hypothetical nature of many CV studies. Indeed, there is evidence to suggest that under real market conditions, when real cash is involved, rejection of the scenario is much less prevalent (Bishop and Herberlein, 1979).

[6] Sagoff suggests that a jury type scenario is best for providing the "full" information he recommends.

The second explanation of the divergence between WTP and WTA offered by Mitchell and Carson (1989) is that consumers are cautious. This is particularly the case in situations of uncertainty. A number of researchers have suggested that if respondents are not familiar with the good being valued, the reason that WTA is greater than WTP might be strategic. Respondents might underestimate WTP because it may not be worth the money or effort, and overestimate WTA "just in case" (Hoehn and Randall, 1989; Broadhead *et al*, 1998). It has been suggested that if the respondent is risk neutral in the face of a certain situation, and has the time to plan the optimal response, these divergences will disappear. There have been a number of tests of this proposition. In particular, Coursey *et al* (1987) experimented with a learning process within CV, and found that WTP and WTA measures did converge with iterative bidding. List (2000) found that the disparity disappeared when traders of sports memorabilia were experienced. There does appear to be some support therefore, for the hypothesis that uncertainty and cautious consumers lead to the divergence between WTP and WTA.

The third hypothesis which may explain the difference is prospect theory as proposed by Kahneman and Tversky (1979), and its related notions such as endowment effect, cognitive dissonance (Coursey *et al*, 1987) and loss aversion. The basic idea is that goods are perceived as more valuable when they are part of the respondent's initial endowment. Taking something away from this initial endowment implies a loss, and adding to it implies a gain. Prospect theory (Kahneman and Tversky, 1979) shows that the value function is generally steeper for losses than it is for gains. A related idea, cognitive dissonance, relates to what Coursey *et al* (1987) termed wishful thinking about what respondents thought they *ought* to be paid for a "bad" i.e. a loss from their initial endowment. These theories "capture the intrinsic human trait that pain matters more than pleasure and that organisms habituate steady states" (Brown and Gregory, 1999, p327). Shogren *et al* (1994) tested the existence of this endowment effect and found that it did not exist.

Loss aversion is a similar notion. The idea being that respondents to a survey react to gains and losses relative to a reference point, but that losses are considered more important than gains. There is a range of empirical evidence which supports the theory of reference dependant preferences and loss aversion. Bateman *et al* (1997) identify four studies which provide evidence of reference dependant preferences in either experimental or real decision making situations (Myagkov and Plott, 1995; Andreoni, 1995, Samuelson and Zeckhauser, 1988; Benartzi and Thaler, 1995, all cited in Bateman *et al*, 1997) and confirm in their own

[7] Except where the value of the exchange is a large percentage of the purchasers income, or where the transaction costs associated with the exchange are large.

experiments that divergences in the direction predicted by the reference dependent theory, can be found between WTP and WTA.

Finally, a number of explanations for the divergence under the theoretical work of Hanemann (1991), who uses income and substitution theories to prove that divergence between WTP and WTA might be expected within neo-classical economic theory. Randall and Stoll (1980) found that compensating variation and equivalent variation, and therefore WTP and WTA should not differ greatly unless there are unusual income effects present. Hanneman (1991) re-examined this analysis and suggests that while the analysis was accurate, it's implications have been misinterpreted. He shows that differences in WTP and WTA for quantity or quality changes depend not only on income effects but also on a substitution effect. He offers the following propositions. First, that if at least one private market good is a perfect substitute for an environmental good, then compensating variation and equivalent variation should be equal. Second, that if there is zero substitutability between the environmental good and the private good, it can happen that, while the individual would only be willing to pay a finite amount for an increase in the environmental good, there is no finite compensation that she would accept to forgo this increase. This implies that the degree of substitutability between environmental goods and market goods affects the relationship between compensating and equivalent variation. Hanneman argues that substitution effects are likely to have a far greater impact on WTP and WTA than income effects. In terms of substitution he proposed that the closer substitutes a good has, the smaller the disparity between WTP and WTA, and the fewer substitutes a good has the greater the disparity between WTP and WTA.

These propositions have subsequently been tested, resulting in some research which appears to support them and other research which appears to refute them (Adamowicz *et al*, 1993; Shogren *et al*, 1994; Mantymaa, 1999; Knetsch and Sinden, 1984; Knetch, 1990; Bateman *et al*, 1997). Adamowicz *et al* (1993) conducted two experiments and varied the substitutability of the good in different sub-samples. They found that one of the experiments supported the arguments of Hanneman, showing that when substitutes were available (in this case TV as a substitute for tickets to a hockey match) the gap between WTP and WTA reduced. Shogren *et al* (1994) have also concluded that large disparities between WTA and WTP are the result of substitution effects. They found that WTP and WTA did not differ significantly for a market commodity with close substitutes (a chocolate bar), but did differ significantly for a non market good with no substitutes (reduced risk from food-born illness). More recently, Mantymaa (1999) tested Hanneman's theory, using non-experimental data on rights to freely use the countryside in Finland, and a substitute right which limits the freedom of use. This study found that although

substitutability explained some of the disparity between WTP and WTA, it did not explain it all, and concluded that other factors must also be at play.

Some researchers have tried to look at both income and substitution effects on the divergence between WTP and WTA. This was carried out in experiments were both income and substitution effects were controlled for. Bateman *et al* (1997) conducted two experiment using coke and chocolates, wine and teabags and even though income and substitution effects were accounted for, a difference between WTP and WTA was still found. Knetch and Sinden (1984) used lottery tickets and also found that the disparity still existed. It appears therefore that although income and substitution effects have some influence on the difference between WTP and WTA, they cannot fully explain the divergence.

The debate surrounding the divergence between WTP and WTA, and the causes of this divergence is ongoing in the literature. However, in spite of the uncertainty about the causes, general consensus is that WTP is the preferred means of eliciting bids in a CV study as WTA may be based on irrational behaviour, and because the WTP measure provides a more conservative estimate of value, as recommended by the NOAA panel (Mitchell and Carson, 1989; Arrow *et al* 1993; Cummings *et al*, 1986).

4.3.3 Payment Vehicle

The payment vehicle is the means by which the respondent is asked to make her bid. A number of different payment vehicles have been used in CV questionnaires such as taxes (London Economics, 1999) charitable donations (Macmillan, 1998), entrance fees (Kenyon and Edwards-Jones, 1998; Willis and Powe, 1998), water rates (Edwards Jones *et al*, 1997) and product prices (Macmillan *et al*, 1995).

Mitchell and Carson (1989) make a number of recommendations about the use of payment vehicles in CV questionnaires. First the payment vehicle should be familiar to the respondent. Second, the payment vehicle should have a plausible link to the environmental good being valued. Third, the payment vehicle should be neutral in that it doesn't encourage a particular response, unless a policy is being evaluated. For example some vehicles, such as taxes and entrance fees may not be neutral, as they may cause resentment, or may be anchored by what is customary, such as the usual price of a particular product (Bishop and Herberlein, 1979). Finally, the payment vehicle should be incentive compatible. This means that the vehicle ensures that it is in the respondent's own selfish interest to reveal her true preferences for the good in question, i.e. it does not encourage free riding or strategic behaviour.

The payment mechanism used in this study is a charitable donation. Champ *et al* (1997) suggest that donation payment mechanisms are a "useful mechanism for CV because they offer a plausible means of providing small scale public goods" (p 161). They suggest that other payment mechanisms such as tax increases may appear implausible in many public good cases. Champ *et al* show that although some studies have proven that charitable donation mechanisms have performed poorly when tested against real payment, they suggest that it may be possible to design questionnaires so that they perform better. In particular they felt that if the donation could be made more specific, and if the implications for the individuals donation could be spelled out, contingent donations may better predict actual donations.

However, others argue strongly against the use of donations. First, the "warm glow" argument put forward by Andrioni (1990) suggests that donations are motivated in part by the satisfaction that respondents get from giving, no matter what the cause. This implies that a donation mechanism may not be good at valuing specific environmental goods.

Second, Carson *et al* (1999) suggest that the use of charitable donations as a payment vehicle within a CV survey will lead to strategic behaviour by the respondent. They argue that the optimal strategic response in the face of a CV question with a charitable donation payment mechanism would be to respond positively to a dichotomous choice question, which would encourage the organisation to carry out the fund-raising effort. Once asked for the donation proper the optimal strategic response would be to contribute less than her maximum WTP and perhaps even nothing. Charitable payment vehicles, according to this view are not "incentive compatible". The motivation for the respondent to try and increase her choice set, and to be able to make a final choice later, is optimal in economic terms as increases in choice sets leads to increases in utility. This is particularly the case where dichotomous choice (DC) is used as an elicitation format and the charitable donation is used for the payment vehicle.

A number of empirical studies appear to support this argument, and show that actual donations and predicted donations in such circumstances differ significantly. In the UK Foster at al (1997) and Macmillan *et al* (1998) both find that actual donations are smaller than hypothetical bids stated in a CV study[8].

Despite the arguments and empirical evidence against charitable donations as a payment vehicle in CV studies, one overriding concern works in their favour. That is that CV questionnaires should be made as realistic as possible. In many situations a charitable donation may be the most believable scenario, and therefore appropriate in certain contexts.

4.3.4 Elicitation Method

In a contingent valuation questionnaire the most important question is the one asking how much the respondent is willing to pay for the contingent scenario described. This can be asked in a variety of formats. These include open ended questions (OE), dichotomous choice questions (DC), double (2DC) or triple (3DC) bounded dichotomous choice questions, payment card questions or more recently the payment ladder type question (Bann, 2000). Mitchell and Carson (1989) offer the following typology of elicitation methods (Table 4.3).

Table 4.3 A typology of elicitation methods

	Actual WTP obtained	Discrete indicator of WTP obtained
Single question	- open ended - payment card - sealed bid auction	- dichotomous choice - spending question offer - interval checklist
Iterated series of question	- bidding game - oral auction	- dichotomous choice with follow-up

Source: Mitchell and Carson (1989) p 98.

Early CVs used the open ended elicitation method (Hammack and Brown, 1974), which is still widely used. An open ended question format was thought useful as the researcher obtains respondents actual WTP and not an indicator of it, as derived from many of the other formats. It also allows the use of relatively straightforward statistical techniques in analysis (Mitchell and Carson, 1989). Despite it's popularity this format has a number of problems. First, many respondents consider determining the answer to an open ended format to be an "extremely difficult task" (Bennet and Tranter, 1998, p 536). Second, because of this, the format may produce more non-responses or protest bids than other methods (Mitchell and Carson, 1989). Third, in order to help them make this very difficult decision, respondents often want information about the cost of the project, which is not always appropriate in CV surveys. Fourth, a number of authors have suggested that an OE format will encourage strategic behaviour, in particular free riding, when voluntary contributions are the payment mechanism used (Carson, 1999; Ready *et al*, 1996; Bateman *et al*, 1999; Bennet and Tranter, 1998; Arrow *et al*, 1993). Fifth, responses may be extremely sensitive to trivial characteristics presented in the scenario (Ready *et al*, 1996). Finally, although researchers expected that open ended bid response formats would create very high WTP estimates, this has not proved to be the case (Carson, 1999). Indeed there is evidence to suggest that respondents tend to under-estimate

[8] Macmillan (1998) found this to be the case only when zero bidders were excluded.

their WTP, and choose a bid with which they feel comfortable, rather than their maximum WTP which is requested by the questionnaire (Brown, 1996).

Since the recommendation in the NOAA report to use the DC format (Arrow, 1993), CV researchers have tended to move away from the use of OE elicitation formats. However, there appears to be a current resurgence in the popularity of the OE approach, especially in certain situations. Ready *et al* (1996) suggests that those conducting CV research may have been "too quick to abandon continuous methods in favour of the DC method" (p409). Bennet and Tranter (1998) suggest that OE formats may be most suitable when personal interviews are used and when the respondent is familiar with the good.

Dichotomous choice formats are the most widely used alternatives to OE questions. Although the dichotomous choice format had been used for many years, interest has increased since the NOAA panel in 1993 recommended its use over other elicitation formats (Arrow *et al*, 1993). The DC method was first developed by Bishop and Herberlein in 1979 (they called it the take it or leave it approach). This approach pre defines a number of possible maximum WTP amounts. Each respondent is then asked whether she is willing to pay just one of these amounts. Each predefined amount is administered to a sub-sample of the total. The selection of bids is usually determined by a previously conducted OE questionnaire so that the WTP distribution can be ascertained and the bids for the DC questionnaire selected from this range (Rollins, 1997; Mitchell and Carson, 1989; Bowker and Stoll, 1988). The method has a number of desirable properties. First, it is "incentive compatible" meaning that the respondent is encouraged to reveal her true preferences for the good in question, without free riding or behaving strategically. Second, it simplifies the respondents task, as they have to make a judgement about a single price only, and do not have to determine a figure unaided, or consider a range of different prices. This is the type of decision that a consumer, or referendum voter is familiar with as it is the type of situation they are faced with in real market transactions (Bennet and Tranter, 1998).

However, a range of problems are related to the DC elicitation format. First, the approach provides only an indicator of WTP, and not an actual value. Second, it requires a large number of responses so that statistical methods can be used to calibrate WTP estimates. Willis (1995) suggests over 2,000 responses are required which means that it can prove to be more costly than other methods. Third, the DC format may suffer from what has been called "yea-saying", which may lead to an upward bias in WTP estimates (Bennet and Tranter, 1998). Yea-saying is where the respondent readily agrees to the proposed price even when they are not prepared to pay it in

reality. This may partly account for the finding that DC formats reveal higher WTP estimates than open ended ended formats (Boyle *et al*, 1996)[9].

Fourth, the statistical techniques required to estimate WTP from DC questions can be complex and the results of such analysis may be particularly sensitive to functional form, truncation and the statistical estimator of WTP adopted (Mitchell and Carson, 1989; Bowker and Stoll, 1988; Hanemann and Kanninen, 1999). Fifth, the initial values still have to be derived, usually by carrying out a pilot OE CV study. Getting these values wrong can lead to problems with the final results (Brown, 1996; Bennet and Tranter, 1998).

In an attempt to overcome some of these problems and to obtain more information about respondent preferences some researchers have used double or triple bounded discrete choice questions (Hanemann *et al*, 1991; Bateman, *et al* 1999). This is where the respondent is initially asked whether she would pay £X. If she answers yes, she is then asked whether she would be pay some pre-defined higher amount. If she answers no, she is then asked if she will pay some pre-defined lower amount, and so on. This format provides more detail about the respondents preferences. Hanemann *et al* (1991) argues that because of this the approach is statistically more efficient than the single DC approach. He tested the statistical efficiency of a single DC against a double bounded DC question with respect to a number of wetland protection programmes. The confidence intervals were approximately four times larger in the single DC case. The double bounded format not only produced tighter confidence intervals, but also produced lower point estimates for WTP. They explain this by pointing out that one of the advantages of the double bounded DC format is that it offers an insurance policy against a poor choice of initial bid.

There are a number of issues related to double bounded discrete choice questions. First, the respondent is offered the same level of the environmental good at two different prices, this may lead to confusion. Second, the respondent may feel that the interviewee on behalf of the agency is willing to bargain over the price, and may expect a further "offer" in response to her second answer, leading to strategic behaviour in waiting for another offer to be made. Next, the respondent may interpret the price change to imply a quantity change as well, which has implications for the mean WTP for the good on offer. Bateman *et al* (1999) also suggest that

[9] It has been suggested that the yea-saying problems of the DC approach can be alleviated by offering the respondents an either /or format, offering two options. Alternatively a follow-up question could be asked to identify yea-sayers, who may subsequently dealt with separately (Blamey *et al*, 1999). Blamey *et al* (1999) experiment with an elicitation format they call the "dissonance minimisation" format, which aims to get round the yea saying problem by allowing the respondent to decouple the choice of whether or not to support the environmental programme from the commitment of dollars.

the initial bid may provide an anchor for subsequent responses. The desirability of using the double bounded discrete choice question depends on the researchers trade-off between a downward bias (from offering a second option) and a tighter confidence interval available by using this method rather than the simple DC approach (Carson, 1999).

The payment card offers an alternative elicitation format approach (Ready *et al*, 1996; Kenyon and Edwards-Jones, 1998). This provides the respondent with a visual aid, comprising a large number of bids from which they can choose. The respondent is usually also allowed to make a bid which is not offered on the card. Although this method does facilitate the respondents valuation process, it may be prone to anchoring problems, and bias which come from implied cues on the payment card (Mitchell and Carson, 1989; Bann, 2000)

A relatively new elicitation format is the payment ladder, which lists a range of values from high to low and respondents are asked to tick amounts which they are sure they would pay and cross amounts they are sure they would not pay. This provides a interval within which lies the respondents "true" value. This format provides respondents with the time to consider different values, and according to Bann (2000) requires less statistical assumptions. This method may, of course, suffer from similar anchoring problems as those related to the payment card approach.

Given the variety of elicitation formats, research which compares different formats may be useful in determining the most appropriate approach. There has been a large amount of research examining the difference between OE and DC formats, with the majority showing the DC formats produce estimates greater than open -ended formats (Boyle, 1996; Ready *et al*, 1996). Table 4.4 summarises a number of these studies, and shows that the ratio between DC to open-ended is between 1.12 (Kealy and Turner, 1993, cited in Brown *et al*, 1996) and 4.8 (Bateman *et al*, 1999)[10].

A variety of reasons have been offered for this divergence. Boyle *et al* (1996) suggested that "Nay saying" in open ended data systematically shifts the response distribution downwards, and "yea-saying" in DC data shifts it upwards. Ready *et al* (1996) suggests that the reason may relate to the treatment of zero or protest responses.

[10] Care should be taken in comparing such studies, as different formats are used for other aspects of the questionnaire, and different statistical analysis are used.

Table 4.4 Comparisons of dichotomous choice and open-ended WTP estimates

Author	Good	Survey Administration	Independent Samples?	Mean WTP DC	OE	DC/OE
Bishop, Welsh and Heiberlein (1994)	Deer hunting	Mail	Yes	37	32	1.16
Boyle *et al.* (1993)[a]	Moose hunting	Mail	Yes	701	484	1.45
Desvousges *et al.* (1992)[a]	Small oil spill effects	Mall intercept	Yes	240	129	1.86
Duffield and Allen (1998)[a]	Trout fishing	Mail	No	91	29	3.19
Gilbert, Glass and More (1991)[a]	Wilderness protection	Mail	No	10	7	1.47
John, Bregenzer, and Shelby (1990)	River recreation	Mail	Yes	53	33	1.62
Kealy and Turner (1993)[b]	Candy bar	Classroom	No	0.65	0.58	**1.12**
Kealy and Turner (1993)[b]	Acid rain reduction	Classroom	No	18	8	2.20
Kriström (1990, 1993)[c]	Forest preservation	Mail	Yes	395	202	1.96
Loomis, Cooper, and Allen (1988)[a]	Elk hunting	Mail	No	40	14	2.80
Bateman, Langford and Rasbash (1999)	Flood protection	Face to face	Yes	144[d]	30	**4.8**
Loomis, Lockwood, and DeLacy (1993)[a]	Forest preservation	Mail	No	224	100	2.24
Seller, Stoll, and Chavas (1985)[a]	Lake recreation	Mail	Yes	42	9	4.78

[a] This study reported two or more comparisons, one of which is presented here. The other dc/oe ratios were also >1.0.

[b] Median, rather than mean, WTP.

[c] The dichotomous choice is from Kriström's (1990) Table 3 based on the Bishop and Heberlein (1979) method. The open-ended mean is from Kriström's (1993) Table 1 for sample B. SEK were converted to U.S. dollars by dividing by 6, as suggested by Kriström (1990).

[d] Using conventional statistical analysis

Adapted from Brown *et al* (1996)

In both the OE and the DC questions there may be those respondents who reject the scenario, for a variety of reasons, even though they value the good. Ready suggests the treatment of these protest bidders for DC data may produce an upwards bias on the distribution of WTP values. If scenario rejection is greater, the higher the bid, and such returns are omitted from the survey, the remaining data will be biased upwards.

Brown *et al* (1996) suggest that the difference between the two elicitation formats may be due to unfamiliarity with the good. Indeed, in a review of previous studies Kealy and Turner (1993) found the lowest ratio is found when WTP for a very familiar good (a chocolate bar) was elicited.

The NOAA panel recommended the use of DC elicitation formats because they were more consistent with the type of scenario consumers faced in everyday life, and should therefore be easier for the respondent to handle. However, DC formats clearly lead to higher values than OE question formats, and the use of DC therefore conflicts with another NOAA recommendations that the most conservative questionnaire design should be utilised. It is therefore unclear from the literature which is the most appropriate question format for CV questionnaires.

4.3.5 Value Construction

According to some theorists consumers values and preferences are given and immutable, and the role of political authorities is simply to aggregate individual preferences to formulate policy decisions[11] (Smith and Wales, 1999). CV is a method that attempts to elicit these given preferences to allow their aggregation to aid policy making. It is possible to elicit values as people "know their preferences" and can choose between options placed before them (Freeman, 1993, p7) However, the notion of value construction suggests that respondents do not have well-defined preferences for many complex policy options prior to the elicitation process, and that preferences are constructed during the elicitation process itself (Elster, 1983; Gregory *et al*, 1995; Payne *et al*, 1999).

Given this value construction hypothesis it is vital that the elicitation (and construction) process is carefully designed. Gregory *et al* (1993) argue that CV researchers should act as architects, helping respondents to build an accurate expression of value rather than as archaeologists, seeking to uncover what is already there. Some work has been done which shows how researchers might act as architects, to help respondents build values.

[11] This will be discussed further in chapter 5

Gregory *et al* (1997) suggest one means by which it may be possible to trace the decision-path that leads respondents to their final decision. Tracing the decision path allows researchers to determine not only what people want (which could be termed as what they are willing to pay for a certain scenario) but also why they want it, those trade-offs they make in the decision process, and what influences their decision. They even propose that respondents decision paths can be grouped into like respondents, and the responses of the groups compared, giving policy makers a profile of a population in terms of how they are likely to think and respond to certain problems. Satterfield and Gregory (1998) test the decision pathways process in the context of vegetation management alternatives in Ontaria, and find it to be successful in aiding respondents to determine their values. However, the structure of the decision path is determined by the researcher, informed by focus group discussion. It is more likely that each respondent has a different decision path to each of the other respondents, but are being forced down one of a limited number of paths due to the nature of the questioning process.

Other researchers have used different methods to aid the value construction process. Hutchinson *et al* (1997) have utilised verbal protocols in a valuation process, so respondents are thinking out loud when constructing their values, explaining the reason for their responses. Others have used multi-attribute analysis (Keeney and Merkhofer, 1987; Gregory and Keeney, 1994) or decision analysis methods (Keeney, 1992; McDaniels and Roessler, 1998) which break down the valuation process into smaller, more manageable parts that the respondent can assess, and which are then reconstructed by the research team.

More recently, Payne *et al* (1999) argue that value construction problems can be identified as faults in the elicitation process, such as faults in representing the problem, faults in information acquisition and interpretation, and faults in expression or mapping of preferences. They suggest that these faults can be assessed and remedied, using what they call a "building code" to obtain a better value construction and elicitation procedure. Payne *et al* (1999) also suggest that the construction of preferences could be seen from a learning perspective, where researchers can help the respondent in more effective learning about their own values and therefore respondents may state more valid responses.

However the value construction process is viewed, the way in which people develop their preferences is important. It is argued that decision makers should attach more weight to the preferences of someone with a good understanding of the problem, than to the preferences of a respondent who's knowledge of the problem is more limited (Elster, 1983; Sunstein, 1990; Payne *et al*, 1999). Designers of stated preference valuation methods should therefore consider

how respondents determine their preferences, and perhaps put in place measures which will explicity aid the process.

4.3.6 Real versus Hypothetical Willingness to Pay

In the face of such design issues, the question of the validity of CV as a means of measuring non market values arises. One test of the validity of CV studies is to carry out experiments with real payment, and compare the results to a study with hypothetical payment. A body of literature has built up which does just this. Some literature reports on experiments in simulated situations, and others on real situations, often involving charitable organisations where some sub sample of the respondents are actually asked to make the stated donation (Foster *et al*, 1997; Willis and Powe, 1998; Champ *et al*, 1997).

Table 4.5 summaries the results of some of these studies, and shows that in many cases hypothetical WTP is greater than real WTP by a factor of up to 11.74. This suggests that hypothetical CV studies may overestimate real WTP. However, it should be noted that a wide variety of methodology exists between the different studies, making it hard to compare and make generic statements the validity of CV.

This table shows some wide differences between hypothetical and real WTP, but a number of problems relate to the studies that have been carried out thus far. First, many relate to experiments concerning private goods, even though CV studies generally aim to estimate the value of public goods. This implies that only use values are estimated in such studies, where CV studies of environmental goods aim to estimate use and non-use values. This entails the added problem that respondents may be using real market prices as cues in answering the CV question, and therefore not indicating their maximum WTP, but what they consider to be a fair price (Christie, 1999).

Second, there are very few reported cases where incentive compatible mechanisms are used. It has been pointed out above that the use of charitable donations is likely to encourage strategic behaviour in respondents, and yet the majority of real WTP literature uses exactly this type of payment vehicle to test real and hypothetical WTP (Carson, 1999). On the one hand respondents may overstate their willingness to pay if they believe that they will not be asked to make the stated donation. On the other hand, if they do believe they will be asked to make the donation, they may be tempted to understate, indulging in free riding behaviour.

Table 4.5 The difference between hypothetical and real WTP.

Study	Type of Good	Elicitation	Calibration Factor
Bohm (1972)	private	OE	0.9-1.0
Bishop & Heberlein (1979)	hunting permits/private	DC	0.3-1.6
Bishop & Heberlein (1986)	private	OE	1.3-2.3
		DC	0.8
Samples *et al* (1986)	public	OE	1.6+ (donations) 32-300 (tax check-offs)
Coursey *et al* (1987)	private		1.0
Kealy *et al* (1988)	private	DC	1.4
Sinden (1988)	public	OE	0.8-1.5
Brookshire *et al* (1990)	public		2.7
Kealy *et al* (1990)	chocolate/private	DC	1.3
	acid rain	DC	1.4
	reduction/public		2.1
Seip & Strand (1990)	environmental organisation/public	DC	10.3
Navrud (1992)	private/public	DC	1.6-3.2
Brynes *et al* (1992, 1995)	investment in renewable energy	DBDC	9.1-10.2
Neill *et al* (1994)	painting and map/private	OE	3.1-25.1 (means) 6.0-12.0 (medians)
Loomis *et al* (1995)	art print/private	OE	1.8-3.6
Cummings *et al* (1995)	private	DC	2.6-10.5
Brown *et al* (1996)	road removal/public	OE	5.3
Frykblom (1997)	Atlas/private	DC	1.5
Johannesson *et al* (1997)	Chocolates/private	OE/VA	1.64
Blumenschein *et al* (1997)	Sunglasses/private	VA	11.74
Macmillan *et al* (1998)	Isle of Eigg trust fund/public	OE	0.92 - 1.67
Foster *et al* (1997)	bird habitats/public	OE	3.64 - 25.32
Christie (1999)	bird conservation/public	OE	2

Sources: Foster *et al*, 1997; Christie, 1999; Byrnes *et al*, 1999.

DC: Dichotomous choice
OE: Open ended
VA: Vickrey Auction
DBDC: Double bounded dichotomous choice

In a number of the studies, it appears that the amount respondents are willing to pay may be consistent across hypothetical and real CV scenarios, but the divergence occurs when it comes to paying at all. It is not that they pay less, but that they don't pay at all (Byrnes *et al*, 1999; Macmillan, 1998). One of the reasons Brynes *et al* (1999) offer for this is that the cognitive

process respondents go through under hypothetical and real scenarios is different. They argue that respondents are not given the incentive to think carefully about their preferences and their ability to pay when the payment is hypothetical. The cost of misreading their own preferences is minimal if they are not actually asked to pay, but far more costly if they are faced with real payment.

As comparing real and hypothetical payments (criterion validity) is a definitive means by which to test the validity of CV (Mitchell and Carson, 1989) the disparities discussed above could imply that the method is not reliable for valuing non-market goods (Christie, 1999). However, a degree of caution may be wise in interpreting the existing evidence, due to the criticism that can be applied to many of the studies. In particular, it is difficult to devise a situation where hypothetical and real WTP are tested, in which best practice CV is carried out. In the face of these disparities it has been suggested that WTP results should be "calibrated" to obtain more truthful estimate of value (Carson, 1999; Arrow *et al*, 1993). Blackburn *et al* (1994) attempted to estimate a "bias" function in order to aid calibration, and find that they are able to estimate the effect of socio-economic characteristics on the extent to which respondents misrepresent their values. Care should be taken with these results however, since the sample size was small (less than 100), and a private rather than public good was being valued.

An alternative argument might be that criterion validity is just one of a number of tests of validity of CV, and that other tests, such as construct validity (the degree to which the measure corresponds to other measures predicted by theory) often do confirm the validity of CV results. Despite the evidence presented above CV practitioners argue that "while CVM is inaccurate even under the best of circumstances, it is still capable of producing policy relevant values, when competently applied in suitable situations, and as such is the best approach available in many situations" (Bishop and Herbelein, 1986, p146).

4.4 Design of the Contingent Valuation for the Ettrick Floodplain Restoration Project

It is clear that there is much debate in the literature as to the appropriate design of CV questionnaires. In the design of such questionnaires, use of focus groups and pilot questionnaires are strongly recommended. The design of the Ettrick CV questionnaires involved three focus groups and a small pilot survey.

Focus groups are informal discussions in which a skilled moderator probes peoples' attitudes and opinions about a specific topic (Desvouges and Smith, 1988). They have been widely used in market research for many years but have now become important in designing CV

questionnaires, as they offer insights into how people process information and answer questions (Merton *et al*, 1956; Desvouges and Smith, 1988). Using focus groups can provide the researcher with important information on: how the public understands and perceives the status quo; the opinion of the public towards changes from the status quo; public opinion on the type of payment vehicle that might be used; and peoples tastes and preferences. It is also a useful forum for testing how the public respond to and interpret information on a certain topic (Desvouges and Frey, 1989; Hutchinson *et al*, 1996; Johnston *et al*, 1995).

To help with the design of the Ettrick CV three focus groups were conducted in different towns in the Borders (Kelso, Selkirk and Peebles) in June 1998. Participants for the focus groups were recruited by an independent market research company. The aim of the groups was to learn how to distinguish between the "before" and "after" project scenarios; to learn what level of knowledge participants had about different habitats; to check the interpretation of specific words, questions and show cards, and to pilot a draft questionnaire[12].

A number of interesting findings came out of the focus groups. First, that the initial depiction of the site before and after the project was considered unsuitable, as it gave the impression that the area would become an outdoor museum with little provision for local communities to live and work. Participants to the groups suggested that the perspective presented be widened to show that commercial forestry and farmland was still a feature of the area.

Second, in discussion on the most suitable payment vehicle for the CV two issues were raised. That the project was very localised, and that people were aware of the many grants and sources of funding that were available for this type of project. Because of this participants felt that a taxation payment vehicle was unsuitable. Participants felt that donation to a community trust fund was by far the most appropriate and believable method of payment, however, it was important the wording stressed that the project would not go ahead without sufficient donation from members of the public.

Following the focus groups a pilot CV questionnaire was designed, taking account of the focus group recommendations and recommendations from the literature[13]. As discussed in section 4.3.4 an important design issue surrounds the elicitation format. The NOAA panel recommend that the dichotomous choice (DC) format should be used, but this contrasts with other

[12] The draft was adapted after each focus group to take account of what was discussed, and to test the new version on the next group.
[13] In some cases the recommendations from these sources are contradictory.

recommendations that the most conservative questionnaire design is most appropriate (Arrow *et al*, 1993). The DC format consistently produces greater estimates than do open ended elicitation formats (Ready *et al*, 1996; Boyle *et al*, 1996), and is therefore not the most conservative.

Despite these recommendations one of the most important considerations in the design of a CV questionnaire is to make the scenario believable (Mitchell and Carson, 1989). In the Ettrick case study a charitable donation payment vehicle, and an open ended elicitation format was used. There were two main reasons for this choice. First, participants to the focus groups indicated they were more comfortable with the open ended format and the charitable bid vehicle than other options discussed. Secondly, this format and vehicle is one which respondents to the survey were likely to be familiar with, especially given the local nature of the project. A wildwood project also in the Borders Region of Scotland, was campaigning for funds at a similar time that the questionnaire was designed, tested and conducted. In this real situation an open bid in conjunction with a payment card type elicitation method was used with a charitable donation as the payment mechanism. The Ettrick CV took these two considerations into account and split the sample using two elicitation formats. First an open bid, and second a payment card format where respondents were shown a card with intervals payments on, including £5-£10, £11-£15 and so on. Respondents were asked to choose which range included their maximum WTP.

A number of questions in the survey attempted to assess respondents environmental attitude, as this is considered key in respondents action in paying for environmental improvements (Spash, 1998; Bateman, 1997). The usual means of providing indicators of attitudes were used such as ranking a number of rural issues to show respondents priority for the environment. Respondents were also asked about their membership of environmental or community organisations. However, more sophisticated means of assessing environmental attitudes have recently been developed. Question 7 (Appendix 1) attempted to utilise these by asking a series of questions, with responses corresponding to a Likert scale. The questions were adapted from those used by Steele (1996). The aim was to assess the impact of respondent's environmental attitude on their willingness to pay.

The questionnaire was piloted on 20 staff and students around the University of Edinburgh in July 1998. Clearly, the sample for the pilot was not representative of the population to be studied, but using University students and staff provided an convenient and cheap means by which to test the questionnaire. Small amendments were made to the questionnaire following the pilot. In particular, responses from the pilot (and the focus groups) were used to provide

options for responses, so that questions could be closed rather than open. For example, if the respondent stated that they did not want to donate to the project, the next question asked why not. Responses from the pilot were used as possible responses to this in the final questionnaire. The pilot was also useful in assessing how much information respondents could assimilate. Following the pilot, the amount of information read to the respondent about the project was refined, so that it was more concise.

The final questionnaire consisted of three sections (Appendix 1). The first section requested general information about respondents residential status, their participation in outdoor activities, and attitudes towards the environment. The second section provided information about the Ettrick Forest Floodplain Project in the form of text to be read out, and maps, pictures and diagrams to help respondents understand the nature of the site with and without the floodplain restoration project (Appendix 1). This section asked a "payment principle" question, as well as the willingness to pay question, and reminded the respondent of their budget constraint, that the money would go to the Ettrick Project only, and that the project would not go ahead if enough money was not raised through public donation. It also contained a question which allowed protest bids to be identified. Respondents were also asked about their preference for different habitats, by allocating "tokens" between different habitats which were to be found on the Ettrick site.

The final section of the questionnaire requested the usual socio-economic data from respondents, as well as whether they were members of environmental organisations, and how they would rank a range of rural issues in terms of importance, including protecting rural jobs, transport, and protecting wildlife.

The questionnaires were completed in the late summer of 1998, by an independent research company. An independent research company was used to ensure quality and consistency of interviewing. The company carried out internal checks on work done by its staff under the project to ensure that no interviewer bias entered into the sample. 336 questionnaires were completed for the open ended CV, and 360 for the interval CV. The interval questionnaires were completed in August 1998 and the open ended in October 1998. Face to face interviews were conducted in the streets of nine towns in the Borders for both the interval and the open-ended survey. This means that it is possible that one respondent was approached twice to complete a questionnaire, although this is highly unlikely to have been the case. Responses were collected from a stratified random sample of the Borders population, and a small proportion of visitors to

Table 4.6 Socio-economics of the samples and the Borders population

Socio-economics		Open Sample	Interval Sample	Borders Popn
Age				
	16-24	16.67	13.33	11.5*[1]
	25-34	19.94	18.61	15.8
	35-44	20.54	20.84	14.5
	45-54	17.56	18.05	12.8
	55-64	10.42	13.89	7.6
	65+	14.58	15.28	17.9
Sex				
	Male	51.79	46.67	47[1]
	Female	48.21	53.33	53
Income				
	Less than £5000	10.12	7.50	8.3[2]
	£5001 - £10000	12.50	16.12	13.3
	£10001 - £15000	13.99	19.16	14.4
	£15001 - £20000	8.93	13.89	13.3
	£20001 - £25000	9.23	6.39	8.3
	£25001 - £30000	5.06	4.17	12.6
	£30001 - £40000	3.87	2.78	13.2
	More than £40000	2.68	3.05	16.6
	No response	33.63	26.94	
Education				
	O level/grade	25.00	34.17	NA
	Higher level	7.44	8.89	
	Certificate/Diploma	19.64	14.17	
	Degree	14.58	10.56	
	Postgraduate	3.57	1.11	
	Unknown/none	29.66	31.11	
Resident in Borders				
	Day Visitor	6.85	4.72	
	Holiday maker	4.46	7.78	
	Less than 2 years	3.87	6.11	
	3-5 years	8.63	6.39	
	6-10 years	6.85	8.33	
	11-15 years	5.36	7.22	
	16-20 years	8.93	11.11	
	More than 20 years	54.76	48.33	

*This column does not add up to 100%. The remainder are children under the age of 16.

[1] Source: Scottish Borders Council, 1998

[2] Is not directly comparable with survey sample as slight differences in the categories are used: under £3,900; £3,900-£6,500; £6,500-£10,400; £10,400-£14,300; £14,300-£18,200; £18,200-£22,100; £22,100-£31,200; over £31,200. Source Scottish Abstract of Statistics (1998) Table 7B2.

the Region. The sample was stratified according to sex, age and social class. The exact socio-economic profile of each of the samples is shown in Table 4.6.

In both cases the sample was reasonably representative of the Borders population in terms of age and sex, although there is a lack of statistics available for the Borders Region with the appropriate breakdown, making it difficult to assess the overall respresentitiveness of the samples. However, it is clear from Table 4.6 that the upper ranges of the income brackets were not captured in either of the surveys. Although a T-test shows no significant difference between the two survey income means (T = 0.67 P = 0.50), it is difficult to compare these directly to the income estimates for the Borders as a whole. However, this divergence may not be as bad as it first seems by looking at Table 4.6. It is widely reported that respondents to small-scale surveys are not keen to provide income data and it is often those in the higher income brackets that are least likely to provide income information (Alvarez-Farizo et al, 1998). 33.63% of the open CV sample and 26.94% of the interval sample did not respond to the income question, but it is likely that the majority of these respondents came from the higher income brackets.

4.5 Statistical Treatment of the Open Ended and Interval Contingent Valuation Data

Statistical treatment of open ended CV data at its most simple involves estimating a bid curve, showing that willingness to pay (the dependant variable) is influenced by a number of explanatory (independent) variables in a particular way. Using ordinary least squares regression (OLS), the influence the independent variables have on the WTP can be estimated using equation 1.

$$WTP = \alpha + \beta_1 X_1 + \beta_2 X_2 + ... + \upsilon \qquad (1)$$

Where: α is a constant; β_1, β_2, etc is the coefficient on the independent variables whose sign explains the direction of the relationship with WTP and υ is the normally distributed error term. However, this may not be the most appropriate analysis of CV data, as the behaviour of a respondent when completing the questionnaire is relevant to the subsequent statistical treatment (Grosclaude and Soguel, 1994). In particular in many OE CV questionnaires (and in this one) there are a large number of zero WTP responses for which there may be different reasons. In such cases, the reason why a zero response was given is crucial. It is common practice therefore to ask respondents, so that protesters and genuine zero bidders can be identified.

When asked to respond to a CV questionnaire a respondent has a number of decisions to make. First, whether to accept the scenario and state a true value in the questionnaire – this might be

known as the *protest decision* (Mourato and Pearce, 1999). The respondents may object to the contingent scenario or to some aspect of the questionnaire such as the payment mechanism. In this case, the respondent may state a zero willingness to pay and give a corresponding reason which shows that the zero bid may not be a true reflection of their welfare change in the face of the proposed scenario.

Second, the respondent may decide to accept the contingent scenario, and state a bid which reflects the welfare change related to the scenario. Mourato and Pearce, (1999) call this the *participation decision*, and in this case WTP can be equal to or greater than zero. Finally, once the respondent has decided to accept the contingent scenario, and decided that the described project has a positive impact on welfare, she has to decide how much to pay. This might be called the *payment decision*. Following this decision WTP will be greater than zero.

Addressing the protest decision first, it may be interesting to investigate which variables influences the decision to protest. The dependant variable may take one of two values indicating whether the respondent protested, or did not protest. In this case a binary logit (using the logistic cumulative distribution function) or probit (using the normal cumulative distribution function) model is used, as a binary dependent variable is involved.

$$L = \ln\left(\frac{1+e^{z}}{1+e^{-z}}\right) = \ln\left(\frac{P}{1-P}\right) = Z = \alpha + \beta_1 X_1 \ldots\ldots \qquad (2)$$

Equation 2 is the logit, where L is the log of the odds ratio, and Z is ßX. The coefficient, β, measures the change in L for a unit change in an independent variable, X. That is the log-odds in favour of making a protest bid as the independent variable changes by one unit. The α is the log-odds in favour of making a protest bid if the independent variable is zero. The model is estimated by maximum likelihood estimation and not by ordinary least squares.

$$P(Y=1) = \int_{-\infty}^{\alpha+\beta_1 X_1} \Phi(z)dt \qquad (3)$$

Equation 3 shows the probability of an event occuring specified using the probit model, where Φ is the standardised normal distribution function, which when integrated over the limits yields the probability of the event occurring.

Using the logit or the probit tends to give very similar results except when independent variables are very small, when logit will give larger probabilities; when independent variables are very large, when logit will give smaller probabilities; when there are very few either positive

or negative responses; or there is a very wide variation in an important independent variable (Greene, 1997). Although the consensus seems to be that it makes little difference as to which model is used (Greene, 1997; Aldrich and Nelson, 1984).

The probit or the logit models can therefore be used to explain the respondent's protest decision. Once this analysis has taken place, protest bids are normally excluded from further analysis. Next the participation decision should be analysed. There may still be a large number of genuine zero responses to a CV questionnaire where the respondent does not value the good in question (Macmillan *et al*, 1998; Mourato and Pearce, 1999). In such instances if a linear OLS regression is used the results are likely to be biased and inconsistent (Gujarati, 1995). Mourato and Pearce suggest three ways of dealing with CV data with a large number of zero's. First, but less popular, is that the participation decision and the payment decision be separated, and the zero responses analysed separately from the non zero-responses. This allows the data to be analysed using the probit or logit models for the participation decision and the linear OLS regression for the payment decision. However, this type of analysis implies that the participation decision and the payment decision are unrelated. Indeed, it suggests that those who decide not to participate are influenced by different variables and circumstances than those who decide to participate. This is unlikely to be the case. In addition, as suggested by Alvarez-Farizo *et al* (1999), this may create a self-selection bias, as the payment decision is estimated on the self-selected sample.

Two models which allow the participation and the payment decision to be estimated simultaneously are the Tobit model and the Heckman selection model. The Tobit model was developed to analyse censored data, where data are available for some observations only, (for other observations, the dependant variable is zero), and the researcher knows how many observations are equal to zero[14]. It is typically used when the observed data contains a cluster of zeros (Greene, 1995). This type of model potentially fits CV data well, as there is a known number of genuine zero bids, and a known number of positive bids. The Tobit model is expressed as:

$$WTP^* = \alpha + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots + \upsilon \quad if\ WTP^* > 0,\ otherwise$$
$$WTP^* = 0$$

we have:

[14] When it is unknown how many observations have $Y=0$ it is known as truncated data.

$$E(Y=1 \mid X_i) = \Phi\left(\frac{\beta_1 X_1}{\sigma}\right)(\beta_1 X_1 + \sigma\lambda) \tag{4}$$

where

$$\lambda = \frac{\phi(\beta_1 X_1 / \sigma)}{\Phi(\beta_1 X_1 / \sigma)} \tag{5}$$

In this specification Φ is the cumulative density function, ϕ is the normal density function and σ is a scale parameter.

A second way of analysing the participation decision and the payment decision simultaneously is using the Heckman selection model (Heckman, 1979). This model also uses the notion that some of the same variables may influence both the participation and the payment decision. It assumes at least one variable driving the decision to participate in the contingent market is different to the variables that drive the decision about how much to pay. The participation decision is estimated as a logit or probit, by maximum likelihood estimates, and the results held for use in the following OLS analysis on the payment decision. The selection equation is estimated by:

$$z_i^* = \gamma' w_i + u_i \tag{7}$$

for each observation in the selected sample δ and λ are calculated, where

$$\lambda = \frac{\phi(\gamma' w_i)}{\Phi(\gamma' w_i)} \quad and \tag{8}$$

$$\delta = \lambda(\lambda + \gamma' w_i) \tag{9}$$

Where z is whether the respondent makes a positive or zero bid, and γ is the coefficient on the independent variables. λ is the inverse Mills ratio, $\phi(.)$ is the standard normal probability distribution function, $\Phi(.)$ is the standard normal cumulative distribution function, and w is a vector of individual attributes. The payment equation then uses least squares regression

(equation 1) of Y on X and λ to estimate the influence of variables that show how much the respondent will bid, given that she bids a positive sum (Greene, 1997).

The second format of the CV questionnaire provides payment interval data. Protesters in this sub-sample can be dealt with as described above, however analysis of the genuine zero responses and positive responses can take place using a similar analysis to the Tobit model using a special case for grouped data with or without sample selection. This type of analysis is used when data is reported by range only. Analysis of income data provides a good example of data usually reported only by range, and therefore needing this type of analysis (Stewart, 1983).

In the case of the interval CV, WTP is only observed within a number of intervals categorised by a code. A special case of the censored data regression model is therefore required. In the CV survey reported here if WTP is between 0 and £5, WTP is categorised as in group 1; between £6 and £10, group 2; between £11and £20, group 3; £21 and £30, group 4; £31 and £40, group 5;£41 and £50, group 6; and over £50, group 7. The model is specified by:

$$WTP^* = \alpha + \beta_1 X_1 + \beta_2 X_2 + ... + \upsilon \qquad (10a)$$

$$WTP^* = j \; if \; A_{j-1} \leq A_j, \; j = 1.....7, \; A_0 = -\infty, \; A_7 = +\infty \qquad (10b)$$

Where WTP* is the latent willingness to pay and j are the 7 recorded categories into which latent WTP falls, and A are the limits of the group ranges. The conditional mean function is the expected value of WTP* within the range of values, shown in equation 11

$$E(WTP^* \mid X_i, L < WTP^* < U) = \beta x + \sigma_i \frac{\phi_L - \phi_U}{\Phi_U - \Phi_L} \qquad (11)$$

Where L and U are lower and upper bounds respectively

In the grouped data regression model all genuine zeros are recorded under category 1 where WTP is under £5. No distinction is therefore made between zero values and positive values under £5, even though we know that some respondents bid zero. To account for this an alternative model, a grouped data regression model with sample selection is desirable, allowing a similar process as the Heckman selection model used above for the open CV data. In this model the data for the grouped regression model is selected non-randomly via a Heckman style selection procedure (Bhat, 1994; Greene, 1995).

$$WTP^* = \alpha + \beta_1 X_1 + \beta_2 X_2 + ... + \upsilon$$

$$WTP = j \text{ if } A_{j-1} \leq A_j,\ j = 1.....7,\ A_0 = -\infty,\ A_7 = +\infty$$

$$Partic^* = \alpha + \beta_1 Z_1 + \beta_2 X_2 + ... + \upsilon \qquad (12)$$

$$Partic = 1 \text{ if respondent participates, } 0 \text{ if not}$$

$$[WTP, X] \text{ are observed only when } Partic = 1$$

Those variables which influence the participation decision and those which influence the payment decision are therefore modelled simultaneously as in the Heckman model specified above.

4.6 Results of Open Ended and Interval Contingent Valuations

The questionnaire gathered general information about respondents such as their participation in outdoor activities, the environment in which they were brought up, and their membership of environmental organisations. Table 4.7 shows the results, and indicates a high degree of convergence between the two samples.

Table 4.7 General and attitudinal information about the respondents

	% of OE sample	% of Interval sample
Participate in outdoor activities?		
Yes	74.4	69.44
No	25.3	29.17
Physical environment brought up		
Near the centre of a town	28.87	27.22
On the Outskirts of a town	32.44	22.22
Near the centre of a city	8.63	9.17
On the outskirts of a city	5.36	7.22
In the countryside, but close to a town/city	18.15	27.22
In the countryside, along way from a town or city	6.55	6.67
Member of an environmental group?		
Yes	17.26	14.17
No	78.57	84.72

Note: Columns do not add up to 100 due to missing values and rounding errors.

Table 4.8 shows a number of findings of note. Given that the survey was conducted in the Borders, it was possible that respondents would be familiar with the project site and area. In

both surveys the majority of the respondents had not visited the project site, however 36% of the open ended sample and 45% of the interval sample had visited the site at least once in the last year. When asked about their preferences for the site 70% of the open ended respondents and 78% of the interval respondents preferred the site with the project.

Table 4.8 Respondent thoughts and experiences of the project site

	% of OE sample	% of Interval sample
How many times visited Ettrick in the last year?		
Never/don't know	64.18	55.28
Once	7.76	10.83
2-3 times	13.43	16.11
4-5 times	4.18	5.56
6-10 times	5.07	4.72
More than 10 times	5.37	7.50
Prefer site with project?		
With	69.94	77.78
Without	17.56	12.50
Don't know	12.50	9.17
More likely to visit site with project?		
Very likely	30.65	31.95
Quite likely	37.20	36.67
Not very likely	11.01	14.44
Not at all likely	16.07	10.56
Unsure	4.76	6.11

Given this result it is not surprising that over 60% of the samples stated that the were either very likely or quite likely to visit the site if the project went ahead. Interestingly, 13% and 9% said they were not sure whether they preferred the site with or without the project, and 5% and 6% of the open and interval samples respectively were unsure of the impact of the project on their likelihood of visiting the area. This shows that many of the respondents were uncertain about their preferences for the project as described in the survey.

The results from the open ended and interval contingent valuation can be analysed with reference to the protest, participation and payment decisions discussed in section 4.5. Figure 4.3 shows the total sample size for the open ended and interval CV data broken down by protest, participation and payment decisions. Although the sample sizes are different, the breakdown of responses to each decision is very similar in both cases. 29% of the open ended sample and 31% of the interval sample protested or gave no reason for their zero bid. Although "no established theoretical criteria or established protocols exist for excluding responses" (Boyle and Bergstrom, 1999, p198) it is common practice to identify and exclude all protest bids

(Jorgensen *et al*, 1999). There seems to be little in the literature which makes recommendations on how to deal with those bids which are zero, but for which there is no reason. This is important as the results change significantly if zeros for which there is no explanation are removed rather than retained in the sample. Table 4.9 shows the descriptive statistics for the open ended and interval data with and without the removal of unexplained zeros with the identified protesters.

Table 4.9 Descriptive statistics with protesters, and protesters and unaccounted zeros removed

	Open CV data		Interval CV data*	
	Protesters removed	Protesters/zeros removed	Protesters removed	Protesters/zeros removed
N	308	232	344	249
Mean (£)	9.93	13.18	5.69	10.07
Std.Dev.(£)	60.74	69.71	10.10	9.24
Minimum (£)	0	0	0	0
Maximum (£)	1000	1000	55	55

*calculated using conditional mean from censored data regression model, as shown in Equation 11, Section 2.5.

Including zero bids for which there is no explanation, implicitly assumes that these bids are valid zero bids. This may not be the case. One might hypothesise about what motivates a respondent to state a zero WTP and then not provide an answer as to why. If they found the whole scenario absurd, or they found the line of questioning too difficult they may give a zero WTP and a nil response to the reason question. In either of these cases, the zero bid more closely resembles a protest than a genuine zero, which implies that these responses should be removed. In the following analysis of the participation and payment decisions all protesters and zero bidders who provided no explanation were removed, despite the fact that this means the percentage of overall protesters is relatively high. Around 30% in the two samples were classed as protest bids, as compared with between 6%-22% reported by Alvarez-Farizo *et al*, (1999) in other Scottish CV studies. As well as identifying protest bidders, a number of explanations were offered for respondents giving a genuine zero bid (Table 4.10). The reason for protesting for all respondents was that they felt some other body should pay such as the government or the lottery, unfortunately, the coding of the questionnaire did not allow the recording of who respondents thought should pay. For example, some may have thought the government should pay, whilst others might have felt the lottery should pay. This was not recorded.

Figure 4.3 Respondent decisions in the open and interval CVs

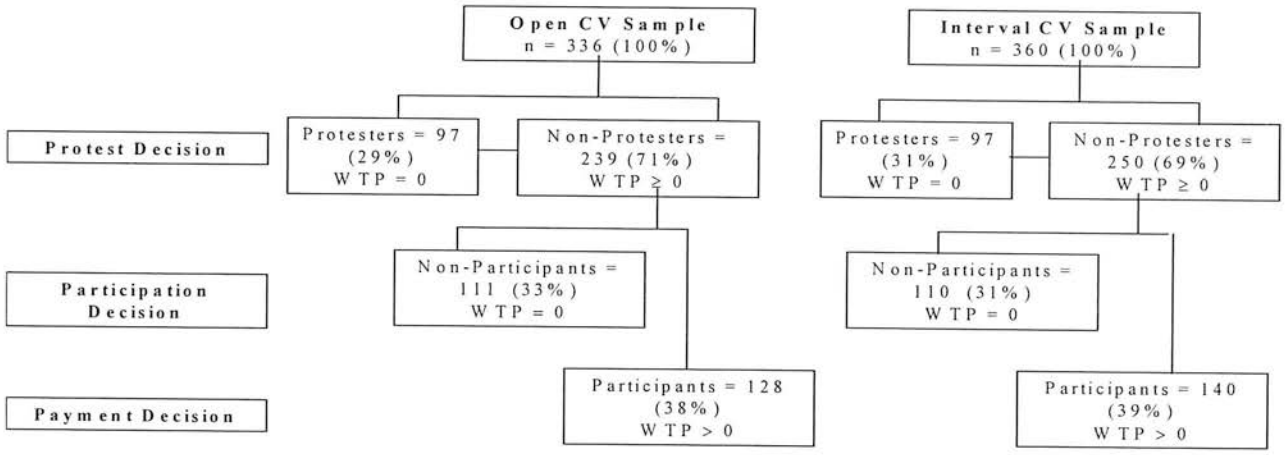


Table 4.10 Reasons for stating a zero WTP

	Open data		Interval data	
	N	% of zero bids	N	% of zero bids
Zero bids	214	100	203	100
Not afford it	53	25	41	20
Other genuine zero	58	27	52	25
No reason	69	32	95	47
Protesters	28	13	16	8

As discussed above logit or probit models can be used to analyse binary decisions, and are therefore used to analyse the protest decision. Given that the questionnaires were the same until the valuation question, the protest and non-protest responses can be pooled to analyse those factors which influenced the decision to protest. Table 4.11 shows the variables that have influenced the decision to protest using the logit and probit model for the pooled data. It is clear that there is very little difference between the results given by the two different models. The same variables are significant whether the logit or the probit is used.

The log of income (LOGINC) is significant and negative, so that as income increases the probability of protesting falls. This may be because those with a higher income can afford to donate and therefore do not suggest that others should pay rather than themselves. Age is also shown to be influential, with older respondents being more likely to protest. Participation in outdoor activities (Q2) also has a significant impact, suggesting that the more activities a respondent participates in the more likely they are to protest. Perhaps indicating that they see the environment as a free good as of right, and that they should not have to pay for it.

Most significant of all variables was the number of tokens (see appendix) the respondent allocated to deciduous woodland over other habitat types (Q16DECID), indicating the preference for deciduous woodland over other habitats. Respondents who allocated more tokens to deciduous woodland were more likely to protest. This may also be related to an ethical stance, in that they object to paying for such natural habitats, or may be related to knowledge that public funds are available to fund deciduous woodland, a point that came out of the focus groups carried out in designing the questionnaire.

Another proxy for attitudes that proved to be significant, is the ranking of the importance of "transport" and "jobs" within a group of rural issues (Q17TRANS and Q17JOBS). Both variables were significant and negative. The more important jobs and transport were thought to

be, the higher the probability of protesting[15]. The rationale for this could be that respondents felt money could be better spent on issues other than wildlife and the environment, such as rural jobs and rural transport, leading to an increased probability of protesting associated with these variables.

Table 4.11 Probit and Logit on the protest decision pooled CV data

	Probit	Logit
Constant	-0.5937**	-0.9501**
	0.2420	0.4021
LOGINC	-0.02464**	-0.04167**
	0.01157	0.01908
AGE2	0.007227**	0.011958**
	0.003233	0.005390
Q16DECID	0.007889***	0.012927***
	0.003047	0.005018
Q2	0.06170**	0.10322**
	0.02989	0.04937
Q17TRANS	-0.06485*	-0.10947*
	0.03828	0.06373
Q17JOBS	-0.08017*	-0.13634*
	0.04490	0.07560
N	696	696
p	0.000	0.000
Log-L	-416.535	-416.436
DF	6	6

standard deviation in parenthesis
* 90%, ** 95%, ***99%

Following analysis of the protest decision, all protesters (and unexplained zeros) were removed from the data set for further analysis of the participation and payment decision where the open – ended and interval CV were analysed separately. As discussed above these decisions can be analysed using the Tobit or the Heckman selection model or the equivalent for grouped data. Table 4.12 shows the estimated bid curves using the Tobit and Heckman selection model for the open ended CV, and the grouped data regression (GDR - a special case of the Tobit) and the grouped data regression with selection for the interval CV, and shows all variables included in the model. In each case a number of models containing different variables were tested where for each variable there was some intuitive expectation of influence. The models shown in Table 4.12 for the Tobit, Heckman and the GDR and GDR with selection, are the best fit models, where the most variables which were felt likely to be influential, *a priori*, did prove to be

[15] Respondents were asked to rank a number of rural issues in order of importance, including transport, jobs and housing. Therefore a low score means the issue was given a high level of relative importance and a high score implies a low relative level of importance.

significant. As can be seen in the table different models found different variables to be significant.

Table 4.12 Analysis of participation and payment decision for open-ended and interval CV

	Open CV data			Interval CV data		
	Tobit	Probit (stage 1)	OLS (stage 2)	GDR	Selection (stage 1)	GDR (stage 2)
Constant	118.5584***	2.1549***	33.4833	28.5793***	1.9889***	22.7787**
	*	(0.3869)	(38.9387)	(8.7688)	(0.2252)	(10.4620)
	(37.8032)					
Q10	-32.9992***	-0.4377***	-20.4472	-3.6197***	-0.4194***	
	(7.7977)	(0.0884)	(19.7772)	(1.3793)	(0.0744)	
Q8	-36.5684***	-0.6655***	-24.8333	-10.0988***	-0.5319***	-5.9380
	(13.7173)	(0.1537)	(29.6855)	(3.3240)	(0.1373)	(6.1087)
Q18	-20.4294			-9.9381***		
	(15.2268)			(3.2216)		
Q12			12.2543**			
			(5.6568)			
LOGINC	1.0618	-0.005	1.9132	-0.7537**		-0.8219**
	(1.7459)	(0.0216)	(2.0312)	(0.3158)		(0.3564)
AGE2		-0.0082				
		(0.0057)				
EDUC2		0.1439**		0.0498		-0.1153
		(0.0639)		(0.9288)		(1.0609)
Q17HOUS				3.9555***		3.1194**
				(1.2274)		(1.3882)
Chi^2 (df)		92.06(5)				
Sigma/	96.4003***		58.03	16.7279***	15.3127**	
lambda	(6.2587)		(60.0477)	(1.3838)	*	
					(1.0308)	
Rho					-0.0909	
					(0.4123)	
Log-L	-774.5432	-114.47	-720.46	-281.4601	-380.9858	
N	232	232	122	250	250	

standard error in parenthesis
* 90%, ** 95%, ***99%

Variables which proved significant in the Tobit model of the open ended CV indicate a degree of consistency in the questionnaire results. Two variables were significant at the 99% level in determining WTP. First, respondents who preferred the area with the project (Q8) had a higher willingness to pay. Second, whether respondents were likely to visit the area if the project went ahead (Q10) was influential, implying that people who are more likely to visit the site are willing to pay more. These results are as might be expected and display internal consistency within responses. Interestingly, other variables which may have been expected to influence

WTP do not appear to do so in the Tobit model. Income and membership of environmental organisations (Q18) are not significant.

In the Heckman selection model a number of other variables become significant (Table 4.12). Stage one involves a Probit on the participation decision, which shows that not only are peoples preference for the site with the project (Q8), and the likelihood of visiting the site important (Q10) (significant at the 99% level), but education seems to be important in the participation decision. The higher the education level the more likely they are to participate. Stage 2 models the payment decision. Log of income is positive, but not significant. However, how many times the respondent visited the site in the past year does appear to be an important determinant of the amount a respondent is willing to donate. The more times they have visited the Ettrick Valley, the higher their WTP. This may indicate significant use value for the project.

The interval CV was analysed using the grouped data regression (GDR) model, first without sample selection, where all genuine zeros are categorised as "under £5", and second with sample selection, in a similar manner to the Heckman selection model for open ended data, where the participation decision is modelled using a probit, and the positive bids modelled using the grouped data regression model.

First, the grouped data regression model provides results not too dissimilar to the open ended data Tobit model. Whether the site is preferred with or without the project (Q8), and whether the respondent is likely to visit the area if the project went ahead (Q10) are highly significant in the interval CV as well as the open ended data, once again showing internal consistency in the data. Also influential in the interval data is membership of an environmental organisation (Q18). Those who are members are likely to pay more. The rank of housing is also significant, as housing becomes less important, respondents are willing to pay more. This indicated that respondents consider housing more important than environmental issues and therefore are willing to pay less for environmental projects. Income, however, appears to be significant but negative, a counter-intuitive result.

The grouped data regression with selection shows that once again whether the site is preferred with or without the project, and whether the respondent is likely to visit the area if the project went ahead are highly significant with the expected sign in determining whether a respondent makes a positive bid. Once those who made a positive bid are selected the rank of housing with the expected sign, and log income, with the counter intuitive sign, are found to be influential.

4.7 Discussion

There are clearly a number of differences between the open ended CV results and the interval results. Both data sets show consistency with the significance of Q10 and Q8. Not only does the significance of Q10 show considerable consistency in the results, it also indicates that value is strongly related to potential future use of the area. Clearly then the converse is true. Respondents are willing to donate less if they are unlikely to use the area in the future or have not used it in the past. In the selection model of the open ended data, Q12 (how many times the area has been visited in the past year) is also significant. Respondents seem to be indicating a WTP for use value and option value, but indicating less WTP for non use values such as existence value or bequest value. This is consistent with evidence from Brouwer *et al* (1997) who conducted a meta-analysis of wetland valuation studies. They found that average WTP for wetlands was highest for wetlands with a flood control function, followed by those with a water supply and water quality function, and lowest with those wetlands with the function of providing and maintaining biodiversity.

A particularly interesting aspect of the open ended and interval data is that the mean WTP estimates seem to be small relative to other Scottish CV studies on environmental issues. The fact that protesters and unexplained zeros were removed increased the mean, indicating that it may have been expected to be even greater than other studies. In addition, respondents to this study were asked their WTP on a once only basis, whereas many other studies have estimates WTP per year. Mean WTP for the Machair and Breadalbane ESA's was found to be £25.21 and £13.44 per household per year respectively (Hanley *et al*, 1996). Bullock and Kay (1997) found the benefit of policies that brought about environmental change in the Southern Uplands (where the Ettrick Valley is located) was over £40 per household per annum. Gourlay *et al* (1998) found a mean WTP of £20.60 per household per year for Loch Lomond and £13 for Stewartry. Macmillan and Duff (1998) estimated WTP for native woodland restoration at £35 and £53 for Affric and Strathspey per household per year. Each of these studies found mean WTP substantially greater than those found in this study.

Temporal embedding is the notion that respondents do not respond to time specifications when valuing an environmental good. Theory suggests that respondents will respond to different temporal specifications, such as between a one off payment and a single lump sum, with an implicit discount rate (Stevens *et al*, 2000). Evidence is conflicting as to whether in practice respondents do distinguish between different payment schedules. Whilst Stevens *et al* (2000) found that respondents did distinguish between paying yearly and making a one off payment

(but with very large discount rates ranging from 20-270%), Kahneman and Knetch (1992) found that lump sums and annual payment were identical. Although it is not possible to test for different payment schedules, it does appear that respondents may not have responded to the time specification, which may go some way to accounting for the relatively small values estimated.

In the case of the interval payment schedule, low mean WTP could have been because the payment intervals were too low. However, this does not appear to be the case, given that only three respondents wanted to bid over the interval range.

The wider context in which the surveys took place should also be noted, and may have some bearing on the level of donation respondents were willing to make. The economic situation in the Borders at the time the survey was undertaken was relatively poor and a number of high profile industry closures had been covered in the press, leading to speculation about jobs and rural communities. This climate of uncertainty over jobs and the local economy may have lead to respondents making lower bids than might otherwise have been the case.

Unfortunately, in neither the interval nor the open-ended CV questionnaire, did the series of questions designed to measure respondent's attitude towards the environment, appear to have a significant impact on WTP. This may be due to the fact that a condensed series of questions was used, or that respondents found them difficult to answer in the circumstances of a short face to face interview. Recent evidence shows that measuring environmental attitudes is an extremely complex procedure, and when done well, does have an influence on behaviour in a CV questionnaire (Spash, 1998).

4.8 What Happens Next?

Once CV surveys have been carried and analysed the results usually feed into a further process of cost benefit analysis. This is where CV results are compared to the costs of the project to assess efficiency. In the case of the Ettrick Floodplain Restoration Project, the mean WTP in the open ended CV was £13.18 and for the interval CV £10.07. Defining the population over which such numbers can be aggregated can be problematic. However, it seems reasonable that a minimum population might be all households in the Borders Region. The most recent figure available for this is 43,147 (Scottish Borders Council, 1998). This implies a minimum total value for the project of £568,677 with the open ended data and £434,490 with the interval CV. Of course, it may be argued that the beneficiaries of the project may be wider than the Borders Region, in which case the total value would be greater. These figures may therefore be considered conservative. Both compare favourably with the cost of the project of £335,498 (see

Chapter 2), showing that it does pass the cost benefit test, even using a conservative estimate of benefit. These results then form part of the decision support material that policy makers draw on when making decisions about the project. In the case of the Ettrick the project was going ahead, and the CV results vindicated this decision, and proved to funders that the money spent on the project was worthwhile.

CHAPTER 5

CITIZENS' JURIES

5.1 Introduction

The placing of monetary values on environmental and natural resources provides one means by which projects can be appraised. However, diverse critics including conservationists (Bowers, 1993), philosophers (Sagoff, 1988; Holland, 1997) and even economists (Jacobs, 1994; Hausman, 1993) remain unconvinced of the benefits of this approach. In the face of such criticism, the need for other project appraisal techniques becomes apparent. Interest has developed in approaches which provide an alternative source of public value judgements for natural resource decisions (Brown *et al*, 1995). In particular, some authors have suggested that deliberative methods might have a role to play as alternatives, or complements to more traditional techniques (Jacobs, 1997; Sagoff, 1998). Indeed, a number researchers have assessed the role of one such technique – the citizens' jury (CJ), in evaluating environmental projects.

5.2 What is a Citizens' Jury?

According to Crosby (1995), a citizens' jury (CJ) is a group of randomly selected people, who represent a microcosm of their community, and are paid to attend a series of meetings to learn about and discuss a specific issue and make public their conclusions. Each juror is supposed to represents the public interest and not his/her own self-interest. The idea behind CJs is that given enough time and information, ordinary people can make decisions about complex policy issues. This method aims to strengthen the democratic process by including within it the considered views of a cross section of members of the public (Aldred and Jacobs, 1997). Table 5.1 shows the characteristics that a typical CJ might have.

CJs have been used widely in both the USA and Germany. They were developed by the Jefferson centre in the late 1970's and early 1980's (Crosby, 1995). Known as 'planning cells' in Germany they have been commissioned by local and national government organisations to help in formulating planning policy (Dienel and Renn, 1995). In the USA CJs have been used to consider a much wider range of issues such as health care reforms, teenage crime and even candidates running for election.

Table 5.1 Characteristics of a citizens' jury

1.	The topic for the jury should be of public interest.
2.	The jurors should be selected on the basis of attitudinal or demographic quotas, or both.
3.	Jurors are paid to attend the CJ, which typically runs for 2-4 full days.
4.	The information presented to jurors should come from several points of view.
5.	A neutral moderator should facilitate all discussion.
6.	The jurors should respond to a "charge" or question.
7.	The jury should have the opportunity to review and approve all their findings and recommendations.
8.	The jurors must be allowed to evaluate the process and make public their views.
9.	The jurors must believe that their recommendations will have an impact or at least be considered.

Adapted from Crosby (1995) and James (1999).

CJs are a relatively new concept in the UK. The Institute of Public Policy Research took the lead in developing the model for application in the UK, and arranged a series of CJs addressing health policy questions (Coote and Lenaghan, 1997). This development was furthered in early 1997 when the King's Fund conducted a number of juries also relating to health care issues. In parallel the Local Government Management Board sponsored six juries to address local authority issues (Hall and Stewart, 1996). Since then a number of CJs have taken place in the UK many of which address health issues (Pickard, 1998; Barnes, 1999) or local planning issues such as housing (Clarke and Salter, 1998; Office for Public Management, 1999).

Tonn and Peterson suggested in 1993 that the prospects for using CJs for natural resource management applications seem bright. Jacobs (1997) similarly argued that juries might be useful in environmental decision making. They have been used in the United States in environmental contexts, for example CJs have been used to rank environmental risk, and to assess agricultural impacts on water quality (Crosby, 1998). In the UK experience is limited. Aldred and Jacobs (1997) conducted a CJ in Cambridge on the creation of wetlands in the Fens. Kuper (1998) has addressed the problem of waste management in Hertfordshire using a CJ. There are few other examples in an environmental or natural resource context.

5.3 Design Issues for a Citizens' Jury

Given the important role deliberative democratic theorists imply that methods such as CJs have in western democratic systems, it is crucial that the design of the jury ensures a valid and unbiased outcome. As CJs are relatively new, especially in the UK, and are still developing, there is little published literature on the way in which CJs should be designed. However, reports from previous juries, evaluations of those CJs (especially from overseas), and the limited literature available, do offer some guidance as to how CJs might best be designed.

5.3.1 The Issue and the Charge

The subject matter for a proposed CJ is the first matter for consideration. James and Blamey (1999) state that the subject matter should be sufficiently absorbing. They found in focus groups that a proposed jury on weed control in a National Park in Australia was not considered sufficiently interesting to participants to spend two days immersed in the area. An absorbing issue would therefore seem to be important.

The complexity of the issue may also be a matter for concern. Evidence suggests that Jurors are able to cope with complex and even technical issues, such as constructing budgets (Stewart *et al*, 1994) and the interaction between pollution and human health (Kenyon *et al*, 2000). Indeed, Coote and Lenaghan (1997) suggest that they may be better at tackling complex questions and difficult choices than other methods, because they provide the opportunity for informed deliberation.

Complexity is one of the six criteria suggested by Fife Council (1997) which determine whether an issue can be properly dealt with by a CJ (Table 5.2). If the answer to the questions in Table 5.2 is "yes" in each case, or in nearly all cases, a CJ may the appropriate tool with which to address the issue.

Once the subject matter has been identified, the "charge" or question to which the jury responds must be formulated. Stewart *et al* (1994) suggest there are two issues of concern in designing the charge. First, who defines the question and second, how specific it should be. In the original CJs held in the US and Germany, it was the staff of the institute running the jury who set the charge in collaboration with the sponsoring body. The sponsoring body may have strong opinions on the charge, which may require some balance to ensure there is no bias. For example, if a hypothetical Department of Transport wanted to build a new motorway, they might want ask whether route X, Y or Z is most appropriate. A more important question might

be whether a motorway should be built at all (Stewart *et al*, 1994). There may be a case for letting the Jurors have a say in setting the agenda of the jury process so that such issues can be resolved (Crosby, 1995). However, this may introduce serious practical problems, in terms of administration and time available to the jury.

Table 5.2 Questions to consider in deciding on whether to conduct a citizens' jury

- Can the issue be distilled into one key question?
- Is the issue complex, with various angles or key issues to be considered?
- Does the issue require background information?
- Is the issue of concern to the community?
- Is the sponsoring body open to change in response to the results of the jury?
- Can the issue be tackled and a conclusion reached in the time allowed?

Adapted from Fife Council, 1997.

With respect to the specification of the charge, Coote and Lenaghan (1997) suggest that jurors are better at choosing between clearly defined options than dealing with open ended or abstract charges. However, balance must be ensured between such defined options and ensuring the jurors are able to consider the full range of issues pertinent to the subject at hand. Whatever the nature of the charge it should be "short, direct and clear" Crosby (1995), but must neither be too narrow nor too vague (Stewart *et al*, 1994).

5.3.2 Jury Selection

Jury selection is crucial to the success of the process. Typically juries consist of between 12 and 24 participants who are selected to be what Stewart *et al* (1994) call "symbolically" representative of the relevant population. They suggest that juries can only be symbolically representative because of the very small sample size and the fact that the results of a CJ will not be statistically representative of the population. This contrasts with other methods of environmental evaluation, such as CV, which emphasises the importance of a statistically representative population in the process. In order to achieve fairness, the problem of who is the affected population must be addressed. This may not always be obvious as projects have a range of impacts which have different geographical and temporal ranges (Webler and Renn 1995; Smith and Wales, 1999). This issue may be particularly relevant when juries address environmental issues and policies which may have implications and impacts all over the world.

Webler and Renn (1995) state that all those who are affected should be notified, and where this is not practical, exclusion should be on a basis that is fair to all, for example, randomly.

Jurors should be selected from the affected population in a fair and open way. Some juries are selected in an entirely random manner, for example by using the electoral register. Other use quotas so that representation from different income, racial or attitudinal groups is ensured. Aldred and Jacobs (1997) used a market research firm to recruit Jurors. The market research firm made house to house visits to invite jurors to the CJ. Invitations were made based on a criteria devised to ensure that the jury was balanced and not biased towards a particular group in the community. Barnes (1999) sent out 3,000 letters to a random sample of people from the Belfast electoral role, inviting them to take part in the jury and asking them to fill in and return a questionnaire if they wanted to do so. She reports that 251 replied and from those responses, 16 people were invited to attend the jury based on a profile matching the area profile on age, gender, social class and religion. This appears to be the most widely used method of jury selection (Kenyon *et al*, 2000; Clarke and Salter, 1998; Kuper, 1997; Office for Public Management, 1999; Fife Council, 1997). Lewisham Council used yet another method in their CJ on drugs policy. A variety of methods to attract potential jurors were used, such as invitations through the press, newsletters to parish councils, personal contacts and knowledge, and volunteers. Responses were then pooled, and those actually invited onto the jury were selected using similar profiling techniques to those discussed above.

5.3.3 Selection of Witnesses

Stewart (1994) states that witnesses have been selected to give evidence at CJs in three ways: by the staff of the facilitating organisation; by jurors; or by case managers, perhaps brought together in a steering group (Fife Council, 1997). Typically, the witnesses are selected by the institution running the CJ, in consultation with other interested bodies from all sides of the argument to ensure a balanced programme (Nevin, 1999; Aldred and Jacobs, 1997; Clarke and Salter, 1997).

The suggestion that the entire programme of witnesses is selected by the jury is impractical, although, it has been widely recommended that time should be allocated towards the end of the CJ so that jurors can call any additional witnesses required, and also so that witnesses can be asked to return to clarify points from earlier presentations (Coote and Lenaghan, 1997; Crosby, 1998). Fife Council (1997) used a steering group approach to select their witnesses. Interest groups were represented on the steering group, and debate within the group determined which witnesses appeared.

However the witnesses are chosen, they should represent different points of view (Crosby, 1995), and extreme views from one side of the debate should be balanced with opinions from the other side. James and Blamey (1999) have gone further suggesting that some witnesses may give misleading or incorrect evidence. They argue that some mechanism may be required to correct factual errors in material presented by witnesses. This applies to both oral and written material, as witnesses may be asked to provide a summary sheet of their evidence.

Typically witnesses are asked to speak for 15 minutes and answer questions from the jury for a further 30 minutes (Aldred and Jacobs, 1997; London Borough of Lewisham, 1996; Nevin, 1999). Witnesses may appear alone in front of the jury, with another witness, or as part of a panel. Fife Council (1997) suggest that an ideal jury would have a mix of these formats in order to vary the sessions and maintain the interest of the jurors.

5.3.4 The Deliberation Process

The deliberation process depends to a large extent on the nature and subject matter of the citizens' jury and may change throughout the process. Dienel (cited in Stewart *et al*, 1994) notes that jurors begin work as citizens representing the whole community, but as the process continues, begin to act more like public consultants. For example, they do not take coffee breaks but take drinks into working sessions. In order for such a conscientious atmosphere to prevail, the jury must be carefully organised.

An introductory session is often held before the start the jury (Nevin, 1999; Barnes, 1999; Clarke and Salter, 1998). The purpose of such a meeting is to introduce jurors to each other, to indicate what they might expect to happen in the days of the jury and to introduce any staff involved in the process. These sessions are generally not to provide oral or written information about the subject matter of the jury, as some jurors may be placed at an advantage if they are better able to absorb written information than others who may be put off by such data (Crosby, 1995; Stewart *et al*, 1994).

Deliberation during the jury process may take place in plenary and in small groups. Some jurors may find it difficult especially initially, to talk openly in the whole group. Barnes (1999) noted in the Belfast jury that in plenary sessions, while some jurors contributed 130 times, 129 times or 123 times, other contributed 5, 1 or 0 times. Clearly, other fora are needed so that those who find it more difficult to contribute in plenary have the opportunity to contribute elsewhere. Stewart *et al* (1994) and others (Kuper, 1997; Fife Council, 1997) suggests that small groups facilitate input from shy people, whilst at the same time help to neutralise

particular interests, as strong opinions from one group will be balanced by different opinions from other groups. Crosby (1998) on the other hand suggests that small groups may be more easily overtaken by articulate and opinionated members, especially if they are not facilitated by independent staff.

5.3.5 The Role of Staff

The smooth running of the jury depends to a large extent on the people organising and running it. They research the topic, brief jurors and witnesses, ensure that the necessary material is received by the appropriate people, make housekeeping arrangements and so on (Stewart *et al*, 1994) In particular, they have an important role in the running of the plenary sessions. As Fife Council (1997) point out, there will inevitably be group dynamics at work throughout the process, and it is the job of the moderator to pick up on these and address them appropriately. James and Blamey (1999) set out a series of elements which must be addressed in order that the process progresses smoothly (Table 5.3). Clearly the staff have an important role in addressing each of these issues, although rules developed in partnership with participants are more likely to work than those imposed from outside (Pretty *et al*, 1995), and staff should therefore consult with jurors to establish "rules of engagement".

Table 5.3 Guidelines for managing group dynamics in a citizens' jury

- Develop a set of operating rules to govern behaviour
- Allow time for informal development of operating relationships within the group
- Clarify procedural issues regarding the process
- Continuously evaluate the process

Adapted from James and Blamey, 1999.

There is usually one facilitator to the jury process who chairs the plenary sessions, explains what is to happen in smaller groups session and facilitates the jury to come to a decision at the end of the process. The facilitator may or may not have specific knowledge of the issues at, but must in all cases be impartial in their words and actions (Coote and Lenaghan, 1997).

Facilitating the jury in coming to a decision may be difficult as jurors are likely to have strong opinions towards the end of the process and may disagree within the group (Kuper, 1997). Consensus is the most desirable means by which to come to a final decision or set of recommendations, although this may not always be possible (Coote and Lenaghan, 1997). In

order to reach a consensus plenty of time is needed to work through disagreements, but in some cases no matter how much time is allocated a consensus may not be reached. In such situations a voting system of majority rule may be used (Crosby, 1995). The way in which a jury is to make a decision is important, as exploration of minority views is a valuable feature of participatory methods, such as CJs, which is generally not present with other methods. Using voting rather than consensus may remove this desirable feature. Minority views should always be reported in the final jury report.

The focus of the whole proceedings should allow the jurors to deliberate on the issue at hand, but in order for this to happen careful arrangements need to be in place, and staff are required to ensure the process runs smoothly. Other than the chief facilitator, additional staff are required to help facilitate smaller group sessions, meet greet and brief the witnesses before their presentation, and to take care of housekeeping arrangements.

5.3.6 Reporting Results

The final product of a CJ process is a report, detailing the process and recommendations made by the jury. Typically reports contain all details of the process, including witness presentations, reports on discussion sessions as well as final recommendations, and details of any dissent (Aldred and Jacobs, 1997; Clarke and Salter, 1998; Fife Council, 1997, Hall and Stewart, 1996). Although ideally the jurors would write the report, this is usually impractical and the report is written by the independent institute carrying out the jury (Fife Council, 1997). In order to avoid bias in the final report a draft copy is sent to all jurors for comment and agreement before it is finalised. This ensures that any misrepresentation is eliminated before the report goes to the commissioning body.

The report often also contains some evaluation of the process, from the jurors point of view (Nevin, 1999; Aldred and Jacobs, 1997; London Borough of Lewisham, 1996; Hall and Stewart, 1996). The jurors may be asked about all aspects of the jury process, including the amount of time they were given to discuss the issues, the relevance of the witnesses; whether the process was biased; and how satisfied they were with staff involved. The evaluation provides a check to the report, and shows how the jurors felt about the process and the relevance of the findings.

5.3.7 What Happens Next?

One of the most important elements in a jury process is that the jurors feel their opinion is going to make a difference. Different institutions have dealt with this in different ways. Clearly, a

commissioning body is unlikely to make a commitment to act upon the findings of the jury before it has taken place. However, it is common for the commissioning body to sign a pre-jury contract, obliging them to "consider" the recommendations (Nevin, 1999; Fife Council,1997). Other pre-jury contracts require the commissioning body to act on the findings of the jury or explain why they will not do so (Hall and Stewart, 1997; Smith and Wales, 1999).

Once the report has been finalised it is sent to the commissioning body, and what happens next depends on the jury process and recommendations. There is relatively little evidence in the literature about the role that CJ decisions and recommendations have played in final decision making. This may be due to the fact that much of the literature on CJs is in the form of jury reports, which are written immediately after the CJ has ended. Evidence from the UK suggests that jury recommendations are likely to get bogged down in committees, and council meetings for some time before any decision is taken on what to do about the jury findings (London Borough of Lewisham, 1996; Nevin, 1999).

The Lewisham jury on "What can be done to reduce harm to the community and individuals from drugs?" set up a steering group and developed an action plan from the jurors recommendations. Jurors were invited to attend council meetings to present their findings, and council, police and health authority representatives also attended these meetings to give their initial response to the jury recommendations. A democracy project officer was put in place to oversee the action plan. Biannual reports were sent to jurors following the jury to update them on progress (London Borough of Lewisham, 1996). But there appears to be no published material on whether or how the jury recommendations were acted upon.

Hall and Stewart's (1996) report on the LGMB CJs, describes the links the jury recommendations would have to policy making. They state that one authority said it would act straight away on recommendations where they could do so. Two authorities were putting action plans together based on the recommendations. Another authority was holding a workshop with staff and jurors to inform policy. Yet another was developing an action plan and having it monitored by a task force. Two authorities were taking the recommendations to partner agencies, and finally, one authority was to use the recommendations in a long-term approach to the issue. Clearly, the role that the CJ findings have on policy is very variable, and in many cases quite small.

5.4 Concerns Related to Citizens' Juries

Empirical evidence shows that citizens' juries do have a role to play in encouraging public participation in the decision making process, however, a number of shortcomings relating to the approach should be noted (Hall and Stewart, 1996; Barnes, 1999; Bostwick, 1999).

Firstly, citizens' juries consist of a relatively small number of participants ranging from about 12 to 25. The results of a CJ will not, therefore, be statistically representative of the population (Smith and Wales, 1999; Stewart *et al*, 1994; Crosby, 1998). Ensuring jury members are representative may also be difficult because of the amount of time participants are required to give up. The CJ process takes place over a number of days, generally two to four, which may exclude some categories of people who are unable to free themselves from other commitments. Despite these problems Jacobs (1997) argues, that because the process digs deeper into people's values and beliefs than questionnaire surveys, a smaller group of jurors may exhibit values which are more representative of society than a greater number of questionnaire respondents. Gregory *et al* (1997) argue that longer deliberation with smaller sample sizes provides a depth and richness of response that cannot be obtained from traditional survey methods and larger sample sizes. The CJ process is not based on the analogy of a public opinion poll, but on the analogy of a jury, where it is accepted that a group of 12 individuals can decide matters in relation to criminal and civil law on behalf of, and as representatives of wider society. It is assumed that 12 people who are well informed provide better decisions than a much larger group who are not well informed (Crosby, 1995).

In addition to problems of representativeness, small groups may be open to influence from a dominant member of the group, or by the witnesses that provide the information to the jurors. Either of these could influence the outcome of a CJ. However, it is the role of the facilitator to make sure that individual jurors do not take over the process and use it as a platform to persuade others of the merits of their way of thinking. It is the role of the organiser to make sure the programme of witnesses is such that jurors receive a balanced view of the subject under discussion. A number of steps are also taken to ensure the validity of the jury's findings and the process itself. Firstly, input may be sought from an independent advisor during the preparatory stage of a citizens' jury project with an independent observer being present during actual proceedings (Crosby, 1998). Secondly, upon completion of the report of the jury's findings, a copy is sent to all jury members for verification and amendment if necessary (Stewart *et al*, 1994). Finally, jurors are asked to complete a questionnaire at the end of the process, outlining their attitudes towards the structure, content, independence and efficacy of the process itself.

Any concerns about the dominance of an individual, or concerns about bias would be made known and noted in the final report (Hall and Stewart, 1996; Clarke and Salter; 1998).

There may also be some concerns about CJs based on the replicability of the outcome. That is, whether a different group of jurors come up with the same decision given the same witnesses and the same information. Pickard (1998) reports on two CJs run just a month apart in London in 1996, convened by the same health authority to deliberate on services for the mentally ill. Despite a number of differences in these juries, Pickard reports that "both juries reached very similar outcomes with core recommendations in common" (p. 236). In the US five regional CJ's were run on the subject of agricultural impacts on water quality. The findings of all of these juries were then brought together by one further jury, charged with collating the results and finalising recommendations (Crosby, 1998). Although there was no test of similarity between the regional juries, a final jury was able to pick out core recommendations for an overall report. The limited evidence available therefore suggests that CJs may be able to replicate their findings, although not on statistical significance criteria.

5.5 Design of the Galashiels Citizens' Jury

In order to provide an alternative to the contingent valuation results a citizens' jury was carried out related to the Ettrick project and a associated initiative in the area concerning the natural environment. The jury was carried out in collaboration with a local community environmental organisation, the Borders Forest Trust (BFT). The Borders Forest Trust instigated and ran the Ettrick Forest Floodplain Restoration Project and were keen to encourage consultation and participation of the local community in the project. The jury was asked to consider the restoration of floodplain forest in the Ettrick Valley and identify its good and bad points and how it might add value to the area. The jury was also asked to make recommendations about what this and other such projects should aim to achieve, both individually and collectively, in a region such as the Borders.

5.5.1 The Issue and The Charge

The broad issue to be tackled by the jury was to evaluate the Ettrick Floodplain Restoration Project, and to assess how it fitted into the broader environmental picture of Southern Scotland. The issue was considered suitable for a CJ as it fulfilled the criteria set out by Fife Council (1997) in Table 5.2 above. The issue was capable of being distilled into clear questions. It was complex and required a variety of angles and key issues to be considered. The issue benefited from background information being supplied to respondents and was of concern to the

community. The relevant body (BFT) was open to change in response to the jury results, and it was felt that the issue could be tackled and concluded in the time allowed.

The Ettrick Floodplain Restoration Project is discussed above. However, the project also has a role in the wider context of the environment of the South of Scotland. A new initiative was proposed, the Southern Uplands Initiative (SUI), which if implemented would aim to ensure that all land use and environmental activities in Southern Scotland were co-ordinated[16]. The jury was therefore asked to consider the Ettrick project in the context of the South Upland Initiative, and make recommendations about what such projects should aim to achieve, both individually and collectively.

The charge was developed, in consultation with the BFT. Specifically, the jury was asked to deliberate on the following issues:

- Should the Southern Uplands Initiative go ahead?
- What are the most pressing issues for the Southern Uplands Initiative to address?
- Using the Ettrick Floodplain Restoration project as a case study - What should individual land use and environmental projects in the Borders aim to achieve?
- Using the Ettrick Floodplain Restoration project as a case study - What guidelines might help in achieving these aims?

5.5.2 Jury Selection

The jurors for the Galashiels jury were selected from the interval contingent valuation questionnaire respondents, as described in Chapter 4. One of the questions asked whether the respondent would be willing to talk in more detail about environmental issues in the Borders. Of the 340 people who were interviewed, 147 said that they would be prepared to speak in more detail about environmental issues[17]. In the autumn of 1998 these 147 respondents were sent a further letter asking whether they would like to take part in a citizens' jury in Galashiels from the 4th - 6th December. From those who replied a number were chosen to be representative of the Borders population.

After the selection process had taken place, fourteen people agreed to attend the jury, however, a number had to drop out at the last minute. Interestingly, it became clear very early on the jury

[16] Discussion of why the SUI was included in the research can be found in section 7.6

process that the jurors did not remember answering the questionnaire. They were all keen to know why they where invited and how their names and addresses had been acquired. However, the fact that the jury was selected from the CV respondents provides us with additional information about them. The final jury composition is shown in Table 5.4. The jury was therefore not fully representative of the Borders population (especially with regard to sex). However, those who did attend the jury represented a wide range of views, opinions and backgrounds.

Table 5.4 The composition of the citizens' jury

Category	Grouping	Citizens Jury (percentage)	Borders Population (percentage)
Sex	male	36	47
	female	64	53
Age	16-24	9	11.5*
	25-34	18	15.8
	35-44	18	14.5
	45-54	18	12.8
	55-65	18	7.6
	65+	18	17.9
Occupation of head of household	Professional	9	4.7
	Managerial & technical	27	28.9
	Skilled non-manual	9	11.5
	Skilled manual	27	26.2
	Partly skilled	18	20.6
	Unskilled	9	5.9
	Other	0	2.2

*This column does not add up to 100%. The remainder are children under the age of 16.

Table 5.5 Jurors responses to specific contingent valuation questions

Question	Yes	No	Don't Know
Member of an Environmental Group?	4	7	NA
Willing to Pay for project?	6	2	3

Table 5.5 shows that a significant proportion of the jurors were members of environmental or community groups. This may be expected since it is likely that people willing to participate in a jury are "community minded" and therefore do contribute to such groups. Table 5.5 also shows juror response to the CV question. Interestingly none of the jurors were protest bidders,

[17] Only respondents to the open ended CV were asked.

although 3 did not know whether they would donate to the project and 2 had genuine zero bids. The mean CV bid of the Jurors is £9.69 and is similar to the mean of £10.07 from the population as a whole.

5.5.3 Selection of Witnesses

One of the principal advantages of CJs over opinion polls or contingent valuation, is their ability to adequately inform participants. This information may be provided in a variety of ways such as background papers and presentations from technical experts and stakeholders. In the Galashiels jury eleven witnesses attended and made presentations. These were selected in consultation with the Borders Forest Trust, and in discussions with stakeholders from all sides of the debate. The variety of witnesses represented a range of views and perspectives about the Southern Uplands Initiative, and the Ettrick Floodplain Restoration Project. Witnesses provided both oral and visual evidence during the proceedings and supplied a summary sheet of their evidence for reference. They made short presentations to the jury of 10 to 15 minutes followed by a discussion session with the jury of about 30 to 40 minutes. Witnesses came from a variety of backgrounds such as Scottish Natural Heritage, the local Council, members of a community affected by an environmental project, the Forestry Commission, the Scottish Tourist Board, and environmental managers. Full details of the witnesses, their affiliation, and the subject of their talk are given in Table 5.6 below. Fuller details of their presentations are presented in Appendix.

5.5.4 The Deliberation Process

Before the full sessions began, a pre-jury meeting was held on the preceding Wednesday, which allowed the jurors to be introduced to the CJ concept, to each other, and to the moderator. In the full jury sessions a combination of techniques were used to encourage scrutiny, learning and deliberation. Some sessions involved presentations by one or two witnesses, followed by questions. Other sessions involved the whole jury in plenary, whilst others still revolved around small group discussions, which were fed back to the whole group.

After a very short introduction, the first day of the CJ was devoted to the Southern Uplands Initiative (SUI), and whether it should go ahead in order to co-ordinate environmental projects throughout Southern Scotland. The jurors heard information about what the SUI was, and what it intended to achieve, the background to the natural environment of the Borders and its management. They heard one speaker on the advantages of the initiative, and how the initiative might impact on the economy of the Borders, and one on the disadvantages of the SUI. The

small group sessions where jurors had discussion between themselves, were found to be very beneficial. Jurors found these sessions useful in building confidence and also in translating the information into useful recommendations. In order to focus these sessions, steps were taken to aid the jurors in their deliberations, by asking the groups to complete specific tasks. Gregory *et al* (1997) suggest that participants should be assisted in making three fundamental steps when making decisions. Firstly, framing the decision, which might involve specifying exactly what is proposed, identifying major impacts, and identifying beneficiaries. Second, respondents should be assisted in defining key objectives. Third, participants should be assisted in making trade-offs amongst these objectives. Using tasks within the citizens' jury process each of these steps were taken. For example, jurors were asked in one session to discuss problems and opportunities that the SUI might usefully address. In another, the benefits and pitfalls of the initiative were expounded. In this way the big decision about whether the SUI should go ahead was broken down into manageable and focused parts in order to facilitate discussion, and to encourage the construction of a rational and well informed decision. Sessions on the first day were all facilitated, in an attempt to encourage jurors to speak out, and deliberate on the issues. After the first day only plenary sessions were facilitated. Small group sessions were not moderated, as it was felt that jurors knew how to proceed, and might provide more unrestricted output if left unaided. The unfacilitated sessions worked quite well, however, focusing the discussion and coming to conclusions without help appeared to be more difficult than in the facilitated session.

After having decided provisionally that the SUI should go ahead the jury focused in the second day on individual environmental projects, the Ettrick Floodplain Restoration Project was used as a case study. Once again jurors questioned witnesses from a range of backgrounds who provided evidence from all sides of the debate. Using the Floodplain Restoration Project as an example, the jury discussed what such projects should achieve, and how these achievements might be measured.

The final day involved bringing all the different aspects of the process together to make final recommendations, and hear final evidence. The final recommendations were achieved entirely by discussion and consensus, and approved by all of the jurors. The discussion sessions from previous days proved particularly valuable in the final sessions. They provided a focus for deliberations and allowed qualitative comparisons of, for example, the pros and cons of the SUI, which helped in deciding finally that the initiative should go ahead. A discussion which used

Table 5.6 Timetable for the Galashiels jury

	FRIDAY	Speaker/Session
9.00	Arrival and coffee. Introduction of Jurors	
9.30	Introductory Overview: citizens' jury. Agenda for the three days	Wendy Kenyon (SAC)
10.00	What is the Borders Forest Trust? What is the Southern Uplands Initiative? Overview of the Ettrick Floodplain Restoration Project. How will the BFT respond to the findings of the jury regarding the SUI and Ettrick? Questions from the Jury	Willie McGhee, Borders Forest Trust
10.50	break	
11.15	The history and character of the Borders natural environment. Overview of problems and opportunities that arise in land use and environmental issues in the Borders. Questions from the Jury	Pip Tabor, Scottish Natural Heritage
12.00	Jury discussion: What benefits might an initiative like the Southern Uplands Initiative have? What pitfalls might there be in developing such an initiative?	Facilitated small group discussions
12.30	lunch	
1.30	Problems/opportunities that the Southern Uplands Initiative might address? Opportunities that the SUI might address. Reservations/concerns regarding the SUI. Questions from the Jury	Alex Morris, Forest Authority Derek Lawson, Scottish Borders Council - Planning
2.30	How tourism, tourism income, the environmental and land use projects interrelate in the Borders. What the tourist board would like to see the SUI do to help this interaction. Questions from the Jury	Marion Oates, Scottish Borders Tourist Board
3.00	break	
3.30	Jury discussion: Should the Southern Uplands Initiative go ahead? What are the most pressing issues for a Southern Uplands Initiative to address in the short run, and in the long run?	Facilitated plenary session
4.00	Close	
	SATURDAY	
9.30	Welcome and recap	Wendy Kenyon
9.45	Overview of the objectives of specific projects from different perspectives. Benefits and areas of concern related to individual environmental land use projects (Ettrick as a case study). Questions from the Jury	Peter Weston, Forest Enterprise Ian Laidlaw, Forest Authority
11.00	Break	
11.30	What is the Ettrick Floodplain Restoration Project? What are the aims of the project? Questions from the Jury	Andrew McBride, McBride Habitats - Manager of the Ettrick Project
12.15	Jury discussion: What issues do those considering	Unfacilitated small

	individual environmental projects need to consider? How important are each of these considerations relative to each other?	group discussion followed by plenary
12.45	lunch	
1.45	Positive impacts on the local population. What concerns the locals have about the project. Questions from the Jury	David Green. Member of the Ettrick community
2.45	Break	
3.15	Jury discussion: How might the local population be affected by an environmental project such as the Ettrick Floodplain Restoration Project? What should individual land use and environmental projects in the Borders (such as the Ettrick Floodplain Restoration project) aim to achieve?	Unfacilitated small group discussion followed by plenary
4.00	Close	
	SUNDAY	
10.00	Welcome and recap	Wendy Kenyon
10.10	Jury discussion : should the SUI go ahead? The benefits and the pitfalls associated with the Southern Uplands Initiative. Prioritisation of what the SUI should aim to address.	Facilitated plenary
11.30	Putting the work of the jury into a wider perspective. The need for public consultation regarding environmental and land use issues.	Petra Biberbach, Local Agenda 21 Development Officer
12.00	Jury discussion: good and bad points of the Ettrick floodplain restoration project. What individual projects should aim to achieve	Facilitated plenary
1.00	Lunch	
2.00	Final conclusions for the jury report	Facilitated plenary
2.45	What happens next? Evaluation questionnaires	Wendy Kenyon
3.15	Thanks and close	

consensus to rank the problems and opportunities that the SUI might usefully address, allowed the jury to make practical and philosophical recommendations about what issues the SUI should prioritise. Similarly, when finalising recommendations on the Floodplain Restoration Project, previous sessions discussing desirable achievements of the project allowed the jury to make recommendations on how to judge the success of environmental projects. Details of the different sessions are given in Table 5.6, and show the witnesses and their topics, the tasks completed by the Jurors, and the timings allowed for different sessions.

5.6 Results of the Citizens' Jury

The final conclusions (based on a consensus of the jury) were based on group work as well as on the evidence presented to the jury throughout the three days. On the final day the jurors were

able to: suggest issues that the Southern Uplands Initiative should address; identify benefits and pitfalls of the SUI and suggest solutions to avoid the pitfalls; identify benefits and problems associated with the Ettrick Floodplain Restoration Project, and make recommendations regarding the problems; make recommendations about environmental and land use projects in the Borders and Southern Scotland in general; and suggest a number of criteria under which the success of environmental and land use can be judged.

5.6.1 The Southern Uplands Initiative

The jurors agreed unanimously that the Southern Uplands Initiative was a good idea and that it should go ahead.

Table 5.7 Issues for the Southern Uplands Initiative to address

- The protection and enhancement of indigenous wildlife (plants, animals and trees)
- The co-ordination between different groups involved in land use and environmental issues in Southern Scotland
- Landscape protection and the promotion of balanced land use in the Region
- Ongoing local consultation with local people about the working of the SUI
- The creation of employment for locals where possible - both seasonal and year round
- The promotion of transport links within South Scotland and to destinations outside it
- The promotion of tourism from people both within and outwith the Borders. The jurors felt that information and amenities should be provided around tourism sites
- Advertising and promotion of Southern Scotland
- Leakages. i.e. ensure that wealth created in Southern Scotland should remain there, e.g. timber should be processed in Southern Scotland.
- Problems with farmers. Keeping them in line and in work with inducements for doing environmental works
- Funding for these issues

In considering the issues that the Southern Uplands Initiative should address the jury looked both at broad and more specific issues. Table 5.7 shows the specific issues that the jurors thought the SUI should tackle. Addressing the relative importance of the issues identified, the jurors recommended that the SUI needed to tackle two issues as priorities. That SUI should unite Southern Scotland so that it works together to achieve the aims; and that SUI should promote the protection of wildlife and the natural environment, including the enhancement of existing forestry areas with hardwoods. Behind these two issues came the need to secure funding for the future and aim to keep that money in the South of Scotland. Next, was that SUI should aim to encourage government and non-government organisations in Southern Scotland to work together to tackle jobs, the environment and industry, which should have the effect of stopping rural depopulation. Finally the jurors argued that SUI should eliminate duplication of effort in Southern Scotland, so that work that was done by one agency was not duplicated by another without discussion and co-ordination.

Although the jurors thought that the SUI was a good idea, some concerns or potential problems were voiced. These are set out in Table 5.8, along with proposed solutions.

Table 5.8 Potential problems associated and proposed solutions

Problem	Solution
All agencies must work for the good of the Borders and not their own interests. There should be no empire building, and not too much power held by very few people.	A neutral person or persons should steer the SUI. This could be a group of people who live and work in the Borders with no particular axe to grind
The SUI should not clash with existing policies	It should learn from other initiatives such as the Highlands and Islands Development Board, and the Cairngorms Partnership.
It should not be seen as another layer of bureaucracy, with no public representation	Marketing of the work of the SUI through newspapers, local radio and through surveys should be carried out so that it is not seen as just another layer of bureaucracy and so that the public are informed of the work it is doing.

5.6.2 The Ettrick as a Model for Environmental and Land Use Projects

The Ettrick Floodplain Restoration project was used as a case study for the management of environmental and land use projects in the South of Scotland. The jurors felt that the Ettrick

project had many merits, that could be copied in other projects throughout the Borders and Southern Scotland. These are shown in Table 5.9.

5.6.3 Problems with Ettrick and Proposed Solutions

The jurors identified two areas of concern or contention regarding the Ettrick project: access and future management. First, access. The jurors felt that visitors should be allowed to visit the site, but that they should only be encouraged to visit particular areas. The jurors suggested that visitors should be provided with some information about the site and the wildlife before they visit it. This should tell them about points of interest, but should not tell them where these things were if they were sensitive. It was suggested that an information board should be located in the small car park, and that more detailed information packs should be available to school parties (at a price) who might want to visit. Visitors should be encouraged to visit the higher, forested parts of the Ettrick site, but discouraged from visiting the lower, wetlands part of the site, which are more vulnerable. Some access must be allowed as the money for the project is public money. There was some discussion about a boardwalk which would allow visitors to see the wetlands areas, but cause very little disturbance. The jurors felt that visits to the site should be free, but that a donation box should be located in the car park.

Table 5.9 The merits of the Ettrick Floodplain Restoration Project

- preservation of a natural ecosystem - a world resource
- flood control
- balance of different habitats
- encouraging wildlife
- monitoring of species
- good demonstration scheme for copying
- preservation of indigenous life forms and eradication of non-indigenous
- education of the young and old
- getting back to nature
- decrease the number of sheep and fencing of sensitive areas
- getting rid of blanket forestry

Second, the jury was concerned about the future management of the site. The jurors were concerned that the money for the project might run out and there might be a problem with future management of the site. The jurors felt that it may be possible to start a trust fund dedicated to

the Ettrick to make sure that money was still available for the future management of the project. However, after speaking with a member of the local community, the jurors became less concerned about future management as they were assured that the local community were involved and seemed likely to ensure that the site was looked after into the future.

5.6.4 Recommendations for Environmental and Land Use Projects in the Borders

The jury were able to look at the Ettrick project in a wider context and make a number of recommendations regarding the management of individual environmental projects in the Borders and Southern Scotland. They felt that a variety of projects were needed in an area like the Borders or Southern Scotland, which met a variety of different needs. Different projects might aim to meet different needs, but all of these projects should be co-ordinated in an integrated way. For example, some environmental projects might aim to attract tourism to the area, but such projects must be situated in less environmentally sensitive areas. Others might aim to increase biodiversity, but may not aim to attract tourists. The range of projects should be considered as a whole, to ensure that many different achievements were being made over the Borders and Southern Scotland as a whole. The SUI could co-ordinate this activity.

The jury thought that a separate big project might be a good idea (as a showcase) which would attract attention and money. It must be special to the Borders and give an identity to the Borders. Jurors suggested that in addition to projects like the Ettrick, which might make important contributions to the environment of the Borders and Southern Scotland, other projects such as a wildlife park, dry ski slope, saw/pulp mill, mountain biking competitions (pedal bikes), an equestrian centre or an outdoor activities centre, might help meet some of the other needs of the Borders and Southern Scotland.

5.6.5 How to Judge the Success of Environmental and Land Use Projects

Finally, the jurors were asked how the success of individual projects might be assessed. Environmental and land use projects are inevitably long term, and some measure of success would help in deciding what future projects should seek to achieve. These criteria can be seen as issues which future environmental and land use projects should consider in the planning stages. The jurors suggested that the following criteria could be used to judge the success of environmental and land use projects in Southern Scotland.

Table 5.10 Measures of success for environmental projects in Southern Scotland

- has it got community and farmer approval?
- has the variety of wildlife improved?
- is wildlife getting the protection it deserves?
- has community spirit improved?
- has the project created any problems?
- is the site attractive?
- have property values increased (this could be good and bad. Good for the value of the area - bad if local people can no longer afford houses in the area)?
- are the original aims and goals of the project met? - these should be monitored
- has the site attracted the attention of serious scholars and professionals?

5.6.6 Evaluation of the Galashiels Citizens' Jury

The jury was the first to be held in the Borders, and the first in Scotland on environmental and land use issues. The test of its success might be measured in three ways. Firstly, whether the jurors thought that the process was interesting and useful. Secondly, whether the Borders Forest Trust and those involved in the Southern Uplands Initiative felt the citizens' jury was a useful exercise. Thirdly, whether the jurors were able to come up with useful recommendations which may be of practical use to the BFT and the SUI.

To answer the first measure of success the jurors were asked to complete an evaluation questionnaire at the end of the three days. Eight jurors completed the questionnaire[18], and on the whole they felt that the jury process was enjoyable, interesting and did provide useful recommendations for use by decision-makers in environmental and land use issues. Table 5.11 gives a summary of the results.

The second and third measures of success relate to what the BFT and SUP thought of the process, and whether it produced interesting results. The response of the Borders Forest Trust and those involved in the SUI to the citizens' jury was very positive. The recommendations and decisions of the jury with respect to the SUI were taken to one of the SUI initial steering group meetings, where the remit of the SUI was discussed. The SUI has since been formed and given the name the Southern Upland Partnership.

[18] Those who did not complete it gave no reason for not completing it.

Table 5.11 Summary of participants evaluation of the Galashiels citizens' jury

Were you given an opportunity to put across your own opinions?			
Yes 8	No 0		
Did you have enough input into the final decision?			
Yes 8	No 0		
What was your opinion of the Moderator?			
Very helpful 8	Helpful 0	Not helpful 0	Neutral 0
Were there enough witnesses in the time available?			
Too many 1	About right 7	Too few 0	
Was there enough time for discussion?			
Too much 0	About right 6	Too little 2	
Were the issues placed before the jury clearly understood?			
Very clear 4	Quite clear 2	A little unclear 1	
Was the whole process free from bias?			
Very much free 4	Free 2	Mixed views 1	Not free 0
Were the issues put before the jury too technical?			
Too technical 2	About right 4	Not technical enough 2	
Was the scope of the issue put before the jury too broad?			
Too Broad 1	About right 6	Too narrow 0	
Would the recommendations be useful to the Borders Forest Trust			
Very useful 6	Useful 1	Not useful 0	
Was the citizen's jury process interesting?			
Interesting 7	Reasonably interesting 1		Not interesting 0
Were you satisfied with the whole exercise?			
Yes 8	No 0		

Note: Not all Jurors completed the questionnaire.

The recommendations of the jury were taken into account in defining the remit of this body. Table 5.12 shows the current aims of the SUP, which are very similar to the recommendations made by the jury.

Table 5.12 Aims of the Southern Upland Partnership

- To help Southern Uplands communities shape their own sustainable future
- To provide a cross-regional forum for the Southern Uplands land use issues
- To inform an integrated land use strategy for the Southern Uplands
- To act as a catalyst for land-use projects and initiatives within the Southern Uplands
- To protect and enhance the countryside
- To promote integrated farming, forestry, tourism and other sustainable rural businesses
- To encourage people to live and work in the Southern Uplands

Source: http://www.sup.org.uk/

The recommendations concerning the Ettrick Floodplain Restoration Project were taken forward to both the technical steering group and the local community steering group so that they could feed into the management of the site. One specific aspect that has been taken on board is the juries concern about access to the Ettrick site. Plans are in place to build a car park, and to steer visitors away from sensitive areas of the site to areas on the hillside which are less likely to be damaged by visitor pressure. One of the interesting outcomes of the CJ is that the report is being used by the BFT in a practical way to show sponsors that the project does have public approval, and does appear to add value to the area. This has played a useful role in justifying money going to the project, and securing future funding, even though the jury provided no indication of a monetary value for the project.

5.7 Discussion of Results

The citizens' jury carried out in Galashiels highlights a number of interesting points for discussion regarding the results. It seems clear that the jury report has had an impact on the SUP, as many of the issues that the jury thought the body should address, are clearly set out in the aims of the SUP. For example the jury recommended the protection of wildlife and the natural environment, and one of the SUP's aims is to protect and enhance the countryside. The jury suggested that the SUI should encourage government and non-government organisations in Southern Scotland to work together to tackle jobs, the environment and industry, which should

have the effect of stopping rural depopulation. By comparison one of the aims of the SUP is to encourage people to live and work in the Southern Uplands.

The results of the jury relating to the Ettrick project are also interesting. Measures of success for projects such as the Ettrick, as suggested by the Jurors shows that community issues were thought to be an important measuring stick. Three of the suggested measures relate to community spirit, community approval and community problems, indicating clearly that social and citizen issues seem to be very important in measuring the success of the project. Interestingly, none of the measures relate to income directly being accrued to locals in the area. Clearly, the jurors saw the project through the eyes of the broader community and not through the eyes of the immediate local community who might benefit financially from the project.

Finally, one of the Juries recommendations was that numerous projects with different aims should be implemented in Southern Scotland, but that all of these should be co-ordinated in an integrated way. It is interesting to note that this is the approach to be taken by Scottish Natural Heritage in their National Park Strategy (SNH, 1999), indicating that citizens' juries are able to develop sensible and practical recommendations.

There are also a number of design issues related to the Galashiels jury which call for further discussion. Firstly, the process of sample selection used in this jury was not ideal. As discussed above the jury was selected from respondents to a previously administered questionnaire and although the sample was largely representative, this means of selection may have lead to bias. The jurors should have known that the CJ would be about environmental issues (although in practice, many of them had initially forgotten that they had answered the questionnaire) and may have offered to participate because they had a particular interest in environmental issues. The process of selecting jurors from the electoral role, is less open to bias and is more likely to produce a representative sample. However, in both cases those who put themselves forward for such a process are self-selecting, and therefore perhaps introduce bias.

Secondly, the Galashiels jury was held over a weekend, because it was assumed that more people would be able to attend. However, holding the jury over a weekend did cause some problems in ensuring that appropriate witnesses were available. In the end, all of the witnesses were happy to give evidence on Saturday and Sunday, however a witness panel was not convened on the final day. The jurors in the Borders said such a panel would have been helpful in making final recommendations. Evidence suggests that jurors are prepared to take time off work to attend a jury, especially when they are being paid for their attendance (Nevin, 1999;

Fife Council, 1997; Barnes, 1999). This being the case, it may be advisable to hold citizens' juries on weekdays rather than weekends.

Third, a key aspect of the process was that Jurors were particularly concerned about providing realistic and practical recommendations, which the BFT could use. In advance of sample selection and jury proceedings, a commitment from the BFT that the resulting recommendations would be considered and responded to was obtained. The importance of gaining such a commitment cannot be overstated in relation to this process. This was made clear to jurors at the outset. Given the time and commitment that the jurors gave to the process, it is not surprising that they were keen to ensure that they provided realistic, unbiased recommendations. Jurors were also keen to know how these recommendations would be taken forward. This implies that citizens' juries may be less useful for purely research purposes. Rather they may be most suitable for use when public consultation must take place, and when the results from the consultation will be taken forward in a visible and open way.

Fourth, the tasks given to the jurors in small groups without the presence of witnesses were used to help the jury construct their final recommendations. The jurors found these tasks useful in developing their thinking on the issue at hand, and in coming to conclusions about recommendations in the final sessions. Whilst the deliberations in these sessions cannot explicitly show how the final recommendations were determined, they do have two important functions. First, they provide a useful aid to the jurors in constructing their preferences, whilst allowing the participants freedom to respond in their own way. Second, they provide the researcher with further information about those issues that were discussed and which contributed to the final recommendations. This suggests that CJs may be a useful tool in providing insights into those factors which are significant in the construction of the final decision.

Perhaps one of the most interesting outcomes of the CJ process was that CJs were concerned with both social issues and economics issues related to the project. Although jurors were able to question witnesses who would have been able to provide financial information about the development of the SUP and the Ettrick Floodplain Restoration Project, very few questions of this nature were forthcoming. Recommendations were made without information on financial costs and benefits of projects. However, jurors did consider the finances of the project in their discussion when witnesses were not present. Some discussion took place on whether members of the public should be charged to enter the site, in order that funds could be raised to pay for maintenance. However it was decided that since the project was financed from public money in

the first place, a mandatory charge was not appropriate. Jurors did however suggest that a voluntary donation box should be situated in the car park. It was also suggested that information packs about the project should be sold to interested parties, such a schools, and which might also help raise money for the project.

Equally important to jurors was that community issues, such as community spirit and community education were considered in assessing the project, something that non-participatory approaches would have great difficulty accounting for. This suggests that jurors were considering the project from both a consumer (what it should cost and how it should be financed) and citizen (the social benefits of the project) point of view. Approaches to environmental evaluation which do not allow both views to be considered therefore may be flawed, and efforts to include both points of view in any evaluation method should be encouraged[19].

The jurors were asked to evaluate the process via a discussion on the final day, and by completing individual evaluation forms. Jurors outlined a mixture of curiosity about the CJ process, the desire to contribute to the community, and be involved in decision making about local issues as the main reasons for taking part in the Juries. Some also mentioned the payment of £100 was a further incentive to participate. Jurors indicated that they enjoyed the opportunity to meet and work with others, listen to and scrutinise the information, and enjoyed being able to present recommendations to the BFT. A number of Jurors did state that they would have liked more time to consider the information given, and felt that more time should have been allocated for discussion. This has been found in many other juries as well (Hall and Stewart, 1996). In general however, the response was one of satisfaction, with a desire that the BFT would continue to consult people in this way.

As measures of success of the CJ process, the views of the jurors and the BFT and SUP have been taken into account. Another indicator of success might be whether the CJ allowed the principles of participatory democracy to be put into action. As Crosby has outlined, the role that citizens' juries play in environmental decision making is to provide policy makers with input from a group of well informed and representative members of the community with which to advise the decision making process (Crosby, 1995). The role of the CJ seems to be one of providing views which will inform the decision making process (or the political elites, to use the participatory democracy language) rather than provide a means of making final decisions. CJs in practice (including this one) therefore seems much the same as other approaches which seek

[19] It was pointed out at the AES conference 2000 that the importance of community issues may be due to the self-

to support the decision making process, such as survey based approaches like contingent valuation. It does not appear to adhere as closely to the theoretical ideal that deliberative democracy theorists would like to operationalise in order to address the failings of the current political and decision making environment. Indeed, CJs provide additional information to inform the existing decision making process. The final decision is still made by the representative, rather than the active citizen, as the theorists would have it.

In terms of Arnstein's ladder of participation discussed in Chapter 3 (Figure 3.2), the theory and practice of the citizens' jury might be located on very different rungs. Although a CJ would seem to be on a higher rung than some approaches such as opinion polls or the contingent valuation method, the practicalities of modern political systems does not allow CJs to reach a high level of citizen participation or become a true form of participatory democracy. The ideal would suggest that Citizen Juries might have a degree of delegated power, and therefore might involve a degree of citizen power. However, the reality in this case, and in most (if not all) other cases the CJ is a form of consultation, and what Arnstein would call tokenism in terms of citizen participation.

Despite this, CJs may fulfil a more important function than merely adding to the existing decision support measures. CJ's may act as a counterbalance to survey based approaches by addressing some of the issues with which these methods struggle. In particular, CJ's may balance the ill informed, ill constructed survey response, with a well informed response from a group who have been provided with the time and support to construct their reply. CJs may offset the consumer response offered by survey methods, with the view of citizens with the good of society in mind. Finally they may counterbalance quantitative data with qualitative data that provides practical guidelines as well as aiding the investment appraisal process. Citizens' juries therefore add to and enhance the decision advice tools that are currently available, and may counteract some of the weaknesses inherent in economic approaches.

selecting nature of the jury. Only those that were "community minded" would agree to be a juror.

CHAPTER 6

THE VALUATION WORKSHOP

6.1 Introduction

As discussed in chapter 3, the use of participatory approaches has proved particularly interesting to some researchers carrying out project appraisals, as an alternative to more traditional approaches. Participatory approaches may be defined as "a family of approaches and methods that enable local people to share, enhance and analyse their own knowledge of life and conditions. It facilitates their involvement in the planning, implementation, monitoring and evaluation of decisions and policies which affect their lives" (Chambers, 1992). However, participatory approaches such as citizens' juries have not in general provided quantitative estimates of the value of a project. In an attempt to derive the benefits of participatory and deliberative methods and economic approaches, some researchers have attempted to amalgamate the two. This chapter discusses some of these approaches, and reports on a new approach which combines quantitative and qualitative methods to offer decision support for the Ettrick Floodplain Restoration Project.

6.2 Approaches Which Amalgamate Participatory and Economic Approaches

The rationale for using participatory approaches to complement economic methods in the valuation of the environmental and natural resources is clear. Many economists recognise the complexity of human preferences with respect to the environment, but economic methods alone may not provide sufficient means to evaluate them. The use of PA methods may be one way in which CV practitioners can attempt to better understand people's preferences for the natural environment. A combination of PA and CV methodology may prove to deliver fuller and more reliable results for environmental valuation.

CV researchers already utilise a number of participatory type methods within CV, especially in the design of the questionnaire survey. One point of agreement between some PA facilitators and many CV researchers is that participatory type methods, such a focus groups and semi-structured interviews, can be used in conjunction with questionnaire surveys (Mukherjee, 1995). Mukherjee suggests that PA methods may be used to complement many of the stages involved in traditional surveys. They may help in the design of questionnaires, and in obtaining accurate answers when the questionnaires are carried out. The visual and discursive methods may help respondents in answering difficult or awkward questions. Further, once the questionnaire has

been conducted Mukherjee (1995) suggests that the PA methods may be used to cross check the results.

These arguments may be familiar to CV researchers, many of whom make use of focus groups in the design of a CV questionnaire. Focus groups are informal discussion sessions in which a skilled moderator leads a group of individuals in an in-depth discussion to discover their attitudes, opinions and knowledge of particular issues (Desvousges and Smith, 1988; Johnston *et al*, 1995). The use of focus groups in CV has recently become more popular, especially in the UK, and a variety of techniques such as questionnaire, visual aids, and direct questioning, are utilised by moderators who closely control the focus groups used in CV research (Hutchinson *et al*, 1995; Garrod and Willis, 1997).

The use of focus groups is not the only participatory element of CV studies that has recently become popular. Verbal protocols are now an important part of a good CV questionnaire. A verbal protocol is where respondents are asked think out loud as they respond to a given question or problem. This allows the interviewer to correctly interpret the response and to test whether serious differences in the concept of the good, or misunderstanding of the question exist. Hutchinson *et al* (1995) suggest that many of the biases found in CV studies can be diagnosed using these verbal probes. In the language of PA, they allow the interviewer to investigate whether the "realities" of the respondent and the professional are consistent (Chambers, 1995).

A final example of the use of participatory approaches in CV can be found in the issue of value or reality construction. Value construction originates from psychological theory which aims to explain economic behaviour. It suggests that respondents to a CV study are not merely revealing re-defined preferences in the course of the interview, but are actually constructing their preferences based on the information provided there and then, as discussed in section 4.3.5 (Gregory *et al*, 1997; Gregory *et al* 1994; Gregory and McDaniels, 1987). A similar concept has also emerged in the PA literature.

Fourth Generation Evaluation is a participatory approach to project evaluation which is based on the premise that reality is not 'given' and is not there to be discovered by the detached observer, but rather it is 'constructed' by actors and inquirers who are actively involved in the object of inquiry (Shah, 1997). The implication of these concepts is significant for researchers. It implies that they cannot take the role of an objective onlooker attempting to uncover an existing truth, as traditional social science approaches would have it. Rather, they are part of the process of value or reality construction. If these notions are accepted, the way in which

research is conducted is very important, and using a participatory approach may help the researcher better understand the construction process in which they are involved.

Criticism of the CV method has forced practitioners to look into ways of improving the methodology. Providing just a number from a CV study may no longer be sufficient. The collection of qualitative information associated with the valuation is often just as useful, especially in the verification of the results. CV practitioners who use focus groups and verbal protocols, and who accept, in principle, the notion of value construction, already use some participatory approaches in the valuation process. The question now is whether PA approaches can contribute anything further to CV methodology. One way to address this question is to look at efforts of PA practitioners in environmental valuation, and the efforts of economists using participatory methods.

6.3 Environmental Valuation Using Participatory Approaches

A limited amount of work which explicitly attempts to link PA approach with economic valuation techniques has been conducted (Bishop and Scoones, 1994; Hot Springs Working group, 1997; Adaya *et al*, 1997), and has been termed participatory environmental valuation (PEV) by some (Emerton and Mogaka, 1996). Many of the projects have attempted to value some form of wild food or resource that may be important in the cash-poor economies in developing countries, such as non-timber forest products. Although this work has been carried out in developing countries, insights from these projects may be valuable in indicating how a combination of CV and PA may be more generally applicable.

A common starting point of PEV is to establish what resources exist and how they are used. A variety of PA methods have been utilised in attempting to determine the use and non-use values that make up the total economic value of the resources available. Resource mapping, semi-structured interviews and transect walks have been successfully used to determine what resources exist (Campbell *et al*, 1997; Bishop and Scoones, 1994; Emerton, 1996), but other inventive methods may also prove valuable. A study conducted by the Hot Springs Working Group (1997) used role-plays to determine the values that a community in Zimbabwe derived from a local woodland. Firstly, villagers were asked to identify which individuals and groups had specific interest in the woodland. Next, groups of villagers were asked to prepare role-plays to demonstrate the value of the woodland from different perspectives. The values represented in each play were recorded, and formed the basis of further analysis.

Once the resources are determined and the uses identified, the actual valuation of resources has often been undertaken using a combination of market analysis and participatory ranking and scoring methods. Many of the wild products collected by local communities do have a market value, for example the fuel wood collected by villagers may be used for their own consumption or for sale in the market to generate income. These marketed uses may be placed alongside non-marketed uses in a matrix and ranked or scored to prioritise or value them. Table 6.1 shows the results from the Hot Springs Working Group (1997) project when the values of the community woodland (determined from the role plays) were scored by three separate groups of villagers. Each group were given 100 scoring units to allocate between uses. The scores give an indication of the relative importance of each of the values accruing from woodland resources. As well as the data presented in Table 6.1, the discussion and probing by the study team that went with the process provided important insights. This further information may provide a check on how the groups interpreted each of the values and may also provide a rationale for the scores that were expressed. In this case, although some of the woodland uses had a known and recognised market price, such as poles and fuelwood, and these were scored alongside non-market uses, no explicit inference was made about the monetary value of the non-market uses.

Other researchers have gone further, and calibrated values for non-marketed goods from such data. A value may be inferred by analysing the relative scores allocated to the marketed items and the non-marketed items (Emerton and Mogaka; 1996). The work in such cases is experimental, and further research is needed, but it does provide an innovative alternative to conventional economic valuation techniques in developing countries.

Some researchers in the UK have begun to use participatory type methods (other than just focus group in survey design and verbal protocols) with environmental valuation. Burgess *et al* (2000) uses in-depth discussion as a means of evaluating the CV method, and as a result questions the role of CV in environmental decision making (Burgess *et al*, 2000). However, others have used focus groups to assess CV, and found it to be relatively robust as a valuation technique (Brouwer *et al*, 1999). Brouwer's work is particularly interesting as it involved inviting selected respondents to large scale CV to attend meetings in groups to discuss the CV questionnaire and their responses to it. The CV aimed to elicit public attitudes and preferences to a flood alleviation scheme in the Norfolk and Suffolk Broads in East Anglia. Brouwer *et al* (1999) present a number of findings of interest. First, the majority of participants felt the need to discuss the flood alleviation project with others, and felt such discussion improved their understanding of the questionnaire, making them more capable of making a decision about the project. Second, although not all participants were asked whether they would change their bid

after the discussion, of those who were asked only one participant did do so[20]. Finally, support was found for the CV approach, but respondents also favoured a participatory deliberative approach to inform the CV process. According to Brouwer *et al* "a majority of the group participants preferred personal interviews combined with group discussions as the most appropriate type of public consultation for this specific environmental problem"[21] (p 340). They conclude by stating that a combination of approaches offers future promise for environmental valuation.

Table 6.1 Scores allocated to different uses of forest and forest products

Values	Women	Men	Boys	Total score
Water retention	8	12	11	31
Rainmaking ceremonies	15	8	5	28
Poles	10	8	7	25
Inheritance	7	11	6	24
Aesthetics	7	10	7	24
Preventing soil erosion	7	7	8	22
Grazing	6	5	8	19
Firewood	4	4	8	16
Fruits	3	3	7	13
Camouflage/cover	5	6	2	13
Fibre	4	3	5	12
Windbreaks	4	3	5	12
Shade	4	5	3	12
Sacred places	5	4	3	12
Crafts	3	3	5	11
Medicines	4	4	3	11
Fencing	4	1	5	10
Seasonal Indicators	2	3	1	6
Whips	2	0	1	3
Total	104	100	100	304

Source: Hot Springs Working Group, 1997

6.4 Design of the Valuation Workshop

The remained of this chapter reports on the development, design and implementation of a combined survey/participatory approach to valuing the Ettrick Floodplain Restoration Project. The "valuation workshop" attempts to develop some of the future promise by combining personal interviews and participatory deliberation. The valuation workshop includes aspects of

[20] This may have been due to the apparent open nature of the discussion. It appears that some participants were asked openly whether they wanted to change their answer, but answered that they saw "no need to fill out the questionnaires again." Would this have been the case if the participants were given the CV back after the discussion and asked privately whether they wanted to change their answer?

[21] It is difficult to know how much faith to put into this conclusion as participants were (probably) only familiar with those two forms of public consultation, and not others such as Citizens' Juries, public meetings, etc.

the CV approach, the CJ approach, and utilises RRA methods. The aim was to develop and test a cost effective means to evaluate the Ettrick Floodplain Restoration Project, which offered both qualitative data on participants preferences and values, and economic estimates to feed into cost benefit analysis.

The approach differs from that reported in Brouwer *et al* (1999) in a number of respects. First, where Brouwer *et al* used focus groups to *assess* CV, and therefore used respondents in the groups who had already completed a large scale CV survey, the valuation workshop approach uses a distinct, independent sample of participants to assess the Floodplain Restoration Project. Second, within the workshop, participatory methods are used as a focus for discussion. This offers a number of advantages over standard focus groups, as discussed below. Third, "relevant issues" for discussion in the valuation workshop were not determined before hand, as they were in Brouwer's focus groups. This allows more input from the participants and greater flexibility in the discussion. Finally, the valuation workshop comprises both group discussion, and private questionnaire, whereas it appears in Brouwer's focus groups, participants were asked in the group whether they would change their response and fill in a new questionnaire. The valuation workshop is therefore used as an independent method of valuation and evaluation of the Ettrick project. As it provides both qualitative and quantitative information, the results can be compared with the distinct approaches of CV and CJ, conducted to assess the same project.

In order to select participants 500 letters were sent out to a random selection of addresses in or near each of two towns in the Borders. The letter invited the addressee to one of the workshops, explained that Scottish Agricultural College were carrying out research on the local environment and were interested in their views. It asked them to return an enclosed form if they wished to participate. A pool of possible participants was then drawn up from those who replied, and participants were chosen from this pool to be as representative of the local population as possible. Each participant was paid £20 for their attendance.

The format for the process was tested on a group of students two weeks before the proper workshops were conducted. Although this does not provide an ideal pilot sample group, as they are clearly not representative of the population of interest, they offered a cheap and convenient means by which to test the workshop format. The pilot showed that the proposed format for the workshop worked well, although participants were likely to take longer than anticipated to perform the tasks. The very visual and hands on nature of the workshop tasks worked well with the students and proved to stimulate discussion and participation. However, it was clear from the pilot workshop that a set of very clear instructions was required for the participants. A

protocol was drawn up following the pilot workshop setting down clear instructions which were to be given to participants. This would ensure that each group was given the same instructions and prompted and encouraged in the same way.

The valuation workshops were conducted in December 1999. Due to financial constraints, four workshops were carried out in all, with a total of 44 participants. Table 6.2 shows the socio-economic details of the workshop participants. Although the numbers involved in the workshop does not allow a statistical representation of the Borders population, the table shows that the workshops comprised a good mixture of participants with different socio-economic characteristics.

Table 6.2 The socio-economics characteristics of the workshop participants

Socio-Economics	Number	Percentage
Age		
• Not given	4	9.3
• Under 25	0	0
• 25-34	8	18.6
• 35-44	12	27.9
• 45-54	6	14
• 55-64	4	9.3
• over 65	9	20.9
Sex		
• Not given	2	4.6
• Male	23	53
• Female	18	41
Education		
• Not given	16	37
• level/O grade	14	32
• Higher	7	16
• Certificate/Diploma	3	7
• Degree	3	7
• Post graduate	0	0
• Other	0	0
Household Income		
• Not given	2	5
• Less than £5,000	5	12
• £5001 - £10000	5	12
• £10001 - £15000	6	14
• £15001 - £20000	10	23
• £20001 - £25000	9	21
• £25001 - £30000	2	5
• £30001 - £40000	4	9
More than £40000	2	5

The workshop was conducted in three parts. It began with a simple introduction, setting out clearly why the participants had been invited, how they had been selected, and the format for the evening. Each participant was then given a contingent valuation questionnaire and asked to complete it (Appendix 4). A coffee break was held after this, so that those who were slower with the questionnaire were able to continue with it, whilst others who had finished were able to get coffee. The coffee break also allowed participants to chat informally, before splitting into two groups for the discussion tasks. These tasks involved the use of methods associated with PRA and RRA, such as ranking and scoring exercises, brainstorming and other visual methods. The mixture of skills, attitudes and experiences of the participants, mean that conducting a workshop that encourages everyone to participate can be difficult. However, it is widely acknowledged that learning and deliberation is best done through active involvement (Pretty *et al*, 1995).

Each task was designed to include listening, hearing and seeing. According to Pretty *et al* (1995) participants are likely to "remember 10% of what they read, 20% of what they hear, 30% of what they see, and 50% of what they hear and see." (p24), and although participants did not need to remember - long term - what was said, ensuring they were engaged in the tasks was vital. The use of large sheets of flipchart paper, for the discussion points brought up by participants served a number of purposes: to provide a focus for attention while the discussion ensued; to stimulate discussion between people with different levels of literacy and eloquence; to re-enforce spoken issues; to provide a means for cross-checking within the group discussion; and finally to provide a means of recording the proceedings.

Participatory methods were used in each of the tasks given to the groups. The first task was to discuss "What do you think is good about the Ettrick project? What do you like about it?" The participants were given no more information than was provided in the questionnaire (Appendix 4) on which to base their discussion. Each group provided a ranked list of good points related to the Ettrick project. The second task was "What problems do you see with this project? Do you have any concerns about it?" Each group were asked to discuss problems, rank their relative importance and offer suggestion of how each problem might be mitigated or solved. The final task in this section of the workshop asked the participants "Looking forward, how could we judge whether this project has been successful?" This involved creating a list of means by which the project could be judged in future, with discussion surrounding each suggestion.

In the third part of the workshop participants were asked to complete some further questions individually in a survey format. These questions asked whether the participants would change

the WTP they stated at the beginning of the workshop, and explain why. Participants had now had a chance to discuss the project, assimilate the information more fully and consider the project from different perspectives. The questionnaires were then collected and the average willingness to pay was calculated from the post-discussion WTP bids (with protest bids excluded and genuine zero bid included). This average was multiplied by 43,147, the total number of households in the Borders (Scottish Borders Council, 1998). The final figure calculated was presented to the group as a whole, along with details of how it was calculated. Participants were told how the calculation was made and told that the overall amount presented was the total contribution from people in the Borders if others acted as they had. Discussion followed the presentation of the figure as to whether it represented the true value of the Ettrick Floodplain Restoration Project to the people of the Borders. This discussion concluded the valuation workshop.

6.5 The Results of the Valuation Workshop

The valuation workshop provided a wealth of interesting results. Table 6.3 gives an indication of the representativeness of the workshop participants by showing the composition of the participants as a whole, and the make up of the Borders population. The workshop participants provide reasonable representation of the Borders population, however participants from the 16-24 age group, and more economically active participants would have improved the overall sample. In total, 44 participants attended the valuation workshops.

6.6 Contingent Valuation Results from the Valuation Workshop

The valuation workshop provided both quantitative and qualitative results, and provide some interesting results when compared before and after the discussion part of the process. As is often the case, many of the participants offered protest bids and genuine zero bids. Table 6.4 indicates the number and percentage of participants who were willing to make a donation, were not willing and those who responded "don't know".

Many of those who stated that they would not donate anything were genuine zero responses and included in further analysis, the two protest bids were removed from the data set. Table 6.5 shows that the pre-discussion mean of bids was £11.07, with confidence intervals of £6.09-£16.05, and a median of 10.

Table 6.3 The composition of the valuation workshops

Category	Grouping	Workshop participants (number (%))	Borders Population (percentage)
Sex	Male	23 (52)	47
	female	18 (41)	53
Age	16-24	0 (0)	11.5*
	25-34	8 (18)	15.8
	35-44	12 (27)	14.5
	45-54	6 (14)	12.8
	55-65	4 (9)	7.6
	65+	8 (18)	17.9
Occupation of head of household	Professional	3 (7)	4.7
	Managerial & technical	8 (18)	28.9
	Skilled non-manual	4 (9)	11.5
	Skilled manual	2 (5)	26.2
	Partly skilled	5 (11)	20.6
	Unskilled	4 (9)	5.9
	**Other	16 (36)	2.2

*This column does not add up to 100%. The remained are children under the age of 16.
**Including retired participants, who did not indicate their former occupation, students, housewives and disabled.
Some respondents did not provide socio-economic information and columns may therefore not add up to 100%

Table 6.4 Whether respondents would be willing to donate, and reasons for not donating.

Response	Number	Percent
Yes	22	50
No	7	16
Cannot afford to donate	5	11
I would rather give to other charities	1	2
I do not like the project/environment	1	2
Some other body should be responsible for paying	2	5
Don't Know	15*	34

*Two of those who responded "don't know" gave one of the reasons for this response indicated in the reasons for a "no" response.

Table 6.5 Descriptive statistics on WTP for pre-discussion valuation (N=27)

Mean	Median	Std Dev	Range	95% C.I.
11.07	10	12.59	0-50	6.09 – 16.05

After the discussion, the participants were asked whether they would like to change the amount they said they would donate to the project. Of the 44 participants, 6 (14%) said they would like to change their response. The main reason given for not changing their answer, was that the participants personal circumstances were still the same, i.e., still a student/OAP/unable to afford it. They appeared to be well aware of their budget constraints. Those who did change their bid said that they did so because they were more aware of the problem, or because they had more knowledge (Table 6.6).

Table 6.6 The original and revised WTP bid, and the reason for the change.

Original bid	Revised bid	Reason for change
25	50	Wish it would happen
10	20	It would have a beneficial effect on the local community, Borders community, and is a valuable recreational and educational asset
25	50	Awareness of the problem
20	??	Would be willing to sponsor the project on a monthly basis
DK	10	More knowledge
DK	25	Because of points for the project brought up in the discussion

Although the discussion in the workshop included consideration of both the good and the bad points related to the project, all those who changed their bid revised it upwards. Table 6.7 gives the descriptive statistics for the post-discussion bids, where the mean has increased to £13.59 and the confidence intervals moved to £7.64 – £19.54.

Table 6.7 Descriptive statistics on WTP for post-discussion valuation (N=29)

Mean	Median	Std Dev	Range	95% C.I.
13.59	10	16.07	0-50	6.94 – 19.65

Despite the non normal distribution of the bids, parametric tests are considered to be relatively robust and a t-test was used to test whether both the pre and post discussion mean was significantly different from zero. Both the pre-discussion mean and the post discussion mean were significantly different from zero, with $t = 4.57$ ($p = 0.0001$) and $t = 4.68$ ($p = 0.0001$) respectively.

Levene's test of variance shows that the variances of the pre and post discussion means were not significantly different ($t = 1.586$, $p = 0.221$), therefore a t-test with equal variance was used to

test whether the two means were different[22]. Interestingly, using a paired t-test shows that the discussion had no significant impact on the bids, as the pre and post discussion means are not significantly different ($t = -0.57$, $p = 0.57$). However, given the non-normal distribution of the means, non-parametric tests are more applicable. A Mann-Whitney U test shows that the hypothesis that the pre-discussion median is equal to the post-discussion median cannot be rejected ($W = 747.0$, $p = 0.6735$ [adjusted for ties])[23]. Both parametric and non-parametric tests therefore indicate that the discussion did not have a significant impact on the bids.

6.7 Qualitative Results from the Valuation Workshop

As well as the quantitative results from the contingent valuation conducted at the valuation workshop, the discussion element of the process produced a range of qualitative results. These results offer some indication of the thoughts of the participants during the workshop, which shaped their responses in the CV. They also provide broader indicators of what the participants felt was important. The qualitative results are divided in to four sections. First, the benefits the participants identified from the Ettrick Floodplain Restoration Project. Second, the problems they felt the project might have, and possible solutions to these problems. Third, participants were asked to suggest how the success of the project might be assessed, and finally, participants were asked to discuss the total economic value of the project calculated from their own CV responses.

6.7.1 Benefits of the Ettrick Floodplain Restoration Project

One of the tasks for the participants of the workshop was to consider the good aspects of the Ettrick Floodplain Restoration Project, and to prioritise the issues raised. A brainstorming technique was used to start the discussion where participants were asked to name any benefit of the project. This was written on a piece of paper and placed on the table for everybody to see. All participants in the group were asked, until new points were no longer forthcoming. Similar issues were then put together and given an overall category. Next participants were asked to agree a ranking for these categories. Table 6.8 shows the category names in the first column, the types of issues that came out initially in the second column, and the number of groups which brought up the issues, as a proxy for importance in the final column[24].

[22] The two respondents who changed from a "don't know" response to a positive response have been removed, as paired data is required for Levene's test of variance. A paired t-test is also used to test any difference between the two means of the pre and post discussion bids.
[23] The two respondents who changed from a "don't know" response to a positive response have been included.
[24] There were a total of 8 groups all together. Two in each of the four workshops.

Table 6.8 Ranking of good points related to the Ettrick Project

Category	Selected examples	Number
Environment flora and fauna Conservation	Reduce conifers, Diversity, Encourage wildlife, Forestry and wildlife, As nature intended	8
Social issues	Open days/guided walks; Create employment; Teach about nature; Get kids more involved	7
Farming, Land management	Different use of land for farmers; Prevent erosion; Could be good for farming	5
Pollution	Keep it free from litter; Stop vandalism; Stop lorries; Get rid of forestry (firs); Reduce chemicals on land	4
Tourism/leisure	Guided tours/trails; Tourism to area; OAPs walking; Create jobs	3
Jobs	Create jobs; Attract people to the area	3
Transport	Accessibility; More accessible to people who use public transport	2
Publicity	Public awareness, Advertise widely to encourage donations, Making an attempt	1

All of the eight groups mentioned conservation of the environment, flora and fauna as an important aspect of the project, and 6 of the groups ranked it first. The community aspect of the project was also considered important, and appeared in seven out of the eight group discussions. Tourism and leisure was also considered important. Pollution was considered important, although it is unclear how the project would impact on pollution.

Despite the fact that the participants of the workshop were provided with very little information, the groups were able to raise a wide range of positive aspects that they felt were associated with the project. This provides managers of the site and policy makers an indication of those aspects that the public think should be given a high priority, and perhaps indicates where public funds should be spent in the project.

6.7.2 Problems of the Floodplain Restoration Project

Whilst in their groups the workshop participants were also asked to consider any negative points they thought might be associated with the project. Large pieces of flipchart paper were put in front of the groups, and divided into three columns. The first column was headed "problems", and filled in first by participants raising issues of concern. The second column was headed "ticks". Once the problems were noted, each participant was allocated three "ticks" which they put against the problem(s) they felt was most serious. Finally, the last column was headed "solutions", and participants were asked to suggest solutions to the most serious problems

associated with the Ettrick Floodplain Restoration Project. Table 6.9 shows the problems discussed, the ticks allocated, and the solutions suggested by the participants.

Table 6.9 Problems, an indication of severity, and recommendation of solutions for the Project.

Problems	Ticks	Solutions
Finance	44	Lottery funding/government grants, Sponsorship, European funding Fundraising group e.g. WWF
Continued protection of area, and prevention of damage by visitors	31	Employ warden, Lots of bins/notices/fines, If people caught should pay for breakage, Dogs on leads, Continued funding for maintenance
Access, Parking, and Roads	28	Careful siting of car park, roads may need upgrading
Rural depopulation	8	Employ ranger, Gaining tourism jobs, Jobs offered locally first
Getting public interested	7	Local news, media, education, e.g. schools and colleges
Flooding	2	Flood prevention scheme
Farming pollution from pesticides/silage (into streams)	2	Education of farmers, Monitoring situation, Stricter rules and penalties, Subsidies to go to more environmentally sound options, Grant aid, Organic farming to get rid of pesticides/to modernise equipment
Farmers losing land	2	Compensation, Offer employment opportunities
Pollution from transport	1	Encourage to use lead free, Parking outwith site, Encourage use of public transport
Could become too commercialised	1	Possible organised groups, Ranger managed walks

Those problems with the most ticks were considered most serious by the groups, and therefore financing of the project was thought to be particularly problematic. This is not surprising as less than one hour before, they had been asked whether they would donate into a fund to pay for the project themselves. Following concern about finances the continued management of the site was considered important, including the continued protection of the area and the prevention of damage by visitors to the site. Also considered an important problem was the issue of access to the area, and the roads leading to the site. It was clear from the discussion that the roads were unsuitable for increased numbers of vehicles, that public transport was very poor, and that car parking could be a serious problem.

Other interesting issues were raised, such as rural depopulation if farming and forestry were no longer available to local people, and the potential for pollution from increased transport in the area and from farmers.

6.7.3 Indicators of success of the Ettrick Floodplain Restoration Project

The final task that participants were asked to complete in smaller groups was to look at how the success of the project might be judged in future. As this was the last in a series of tasks, the time was sometimes limited, and what came out of this was a list of possible measures. Table 6.10 indicates the responses to this task and the number of times each measure was mentioned as a potential indicator of success.

Table 6.10 Indicators of success of the Ettrick Floodplain Restoration Project

Suggested measure	Indicator
Are visitor numbers up?	10
Have the diversity of flora and fauna increased?	8
Are schools still interested/visiting?	4
Is it financially viable?	4
Is the community still involved/interested?	3
Has it had media attention?	2
Are there more/larger deciduous trees?	2
Are jobs created?	2
Has there been an expansion of the project?	2

Some of the scores add up to more than eight as similar measures have been amalgamated.

Although limited time was available to discuss this aspect of the Ettrick Project, it is interesting to note that use of the area seems to be an important measure of success, both in terms of visitors and the use of the site by educational establishments and schools. Also mentioned by all groups was the importance of monitoring the diversity of flora and fauna on the site, with a successful project showing an increase in diversity.

Economic measures of success were discussed by some of the participants. Four groups thought a measure of success might be whether the project was financially viable, and two groups felt that a successful project should create jobs. Finally, a number of suggested measures related to involvement and interest in the site by the local community, schools and the media, that is community and social issues were important.

6.7.4 Total Value of the Ettrick Floodplain Restoration Project

The final element of the workshop involved all the participants as one group discussing the total donation that would be made if the mean bid from the group was aggregated over the population of the Borders. In the calculation of the total donation the post discussion bid was used, with protest bids and don't know bids removed. The calculation was explained to the group, and the final figure presented to them. Table 6.11 shows the mean bid for each group, the aggregate

figure, and selected comments made during discussion of the aggregate figure. The group was asked whether the aggregate amount represented the true value of the project. Although the means from each of the workshops look very different, an ANOVA shows that there is no significant difference between them ($F = 0.78$, $P = 0.518$). This is likely to be because of the relatively small numbers giving genuine bids in each group, and therefore the means having wide confidence intervals.

Table 6.11 Mean bid, total donation, and comments from each workshop group

Mean (£)	Aggregate (£)	Comments
16.43	708,905.20	"Doesn't reflect the value of the project (i.e. aggregated figure is too low) but wouldn't actually get that money because there is too much unemployment. The money is needed elsewhere." "The project is priceless but it depends on who carries it out and the cost of setting it up, as to whether the aggregate figure is accurate". "Impossible to put a figure on it. Should be funded by public money."
18.10	780,960.70	"Project is worth more." "The Borders are spread out over a wide area, people who live further away will not want to contribute and will not travel to visit it."
5.00	215,735.00	"The amount is too small to represent the value of the project. There is a difference in benefits to some people than others." "It is worth it for future generations – worth at least that amount."
11.14	480,657.60	"Need information on costing to make a decision." "Cannot cost environment – it is disappearing at an alarming rate". "If you have no money, would you spend what little you have left on bread for your kids or on a plant for your garden?"

This is clearly a big issue, and given that it was the last element of the workshop, very limited time was available to address it[25]. The comments from all the groups can be split into three categories. First, that it is not possible to put a value on such an environmental project, associated with ethical issues. Second, comments surrounded whether or not this aggregate figure would actually be obtained, related to hypothetical versus real payments and also the appropriate population over which bids should be aggregated. There was discussion about lack of jobs and poverty in the Borders, and the notions that there were more important things to spend money on. Alongside such discussion was the clear feeling that money for such projects should come from government, lottery or EU funds. Finally, there was discussion that information on costs (which was not made available) was required before any pronouncement was made on its value.

[23] This highlights as important issue. Aggregation is clearly important, and has to be at the end of the session, by

6.8 Discussion of the Valuation Workshop

Although the sample size of the valuation workshop is relatively small, the results are interesting in analysis of the approach as a stand-alone technique, and in the issues raised in the process. However, in order to assess the process, it is interesting to compare the results to those obtained using the full CV (discussed in Chapter 4) and the CJ (discussed in Chapter 5).

6.8.1 Discussion of the Valuation Workshop Compared to the Contingent Valuation

Although the valuation workshop and the contingent valuation have a number of different characteristics (Table 6.12), such as different sample sizes, different amounts of time, with the valuation workshop adding discussion exercises, it is interesting to compare the results, and the methodology of the two approaches.

Table 6.12 Characteristics of the valuation workshop compared to contingent valuation

	Contingent Valuation	Valuation Workshop
Time	20 minutes	3 hours
Sample size	660	44
Information provided	Limited information in the form of maps, pictures and text. Respondent has no opportunity to ask questions.	Limited information in the form of maps, pictures and text. Participant has opportunity to scrutinise and discuss information with peers.
Main benefits	Estimates value for money Intensity of preferences	Both economic estimates and recommendations Relatively inexpensive Public engagement and participation
Main pitfalls	Design problems Moral objections Accuracy	Quick and dirty Sample size Validity of output
Data elicited	Quantitative data on preferences Monetary valuation	Quantitative data on preferences Qualitative data on preferences Rankings of environmental characteristics Monetary valuation

Given that both the CV and the VW produce monetary estimates of benefit, some comparison of the results can be made. Table 6.13 shows that for all sub-samples the median is above zero.

which time participants are tired and time is short. This means that the issue is not given as much attention as it deserves.

This is important as it shows that in each case at least half of the respondents are willing to pay to ensure the project does go ahead. In the open-ended CV one respondent offered a bid of £1,000, which could be considered an outlier and removed from further analysis. However, the income from this respondent was in the highest range, and it is possible that someone with particular affinity with the project would be prepared to pay such a high amount. The bid was therefore included in further analysis. The open-ended CV results are comparable with the VW CV results, being within -16% for the mean pre-discussion WTP and 3.1% for the post-discussion mean bids, whilst the interval CV means are within 10% and 35% of the pre and post discussion VW means.

Table 6.13 Descriptive statistics for CV estimates gathered using all approaches

	Mean (£)	Median (£)	Range (£)	N
Open CV	13.18	1	0-1000	232
Interval CV	10.07	2.5	0-50+	250
Pre-discussion VW	11.07	10	0-50	27
Post-discussion VW	13.59	10	0-50	29

Table 6.14 uses a two-tailed t-test to compare the means of the different CV estimates and a Mann Whitney U to test the medians both at the 95% level. Intuitively the post discussion results might be expected to differ from other results as the discussion and deliberation might be expected to have an impact. However, this does not appear to be the case in this study. There is no significant difference between the open-ended CV and pre-discussion VW mean or between the open-ended CV and post-discussion mean. A Mann Whitney U is perhaps a more appropriate test given the non-normal distributions, and in every case this shows a significant difference between the medians at the 95% level.

As well as being able to compare the results of the two approaches, it is interesting to compare design aspects, as the valuation workshop may address some of the criticisms that has been directed at CV in recent years (Chapter 4). Firstly, according to Arrow *et al* (1993) respondents to a CV must understand exactly what it is they are being asked to value. Although the valuation workshop provided no more information than the CV, it appears to have clarified the issue for some of the participants, as they changed their bid from a pre-discussion "don't know " response to a post-discussion positive response[26].

[26] Although some doubt exists as to whether this would be the case in different designs of the workshop. For example if solutions to the problems identified were not discussed.

Table 6.14 Differences between WTP determined via different CV specifications

CV	VW	T test (at 95%) (p)	Mann Whitney (at 95%) (p)
Open	Pre-discussion	-0.40 (0.69)	4251.0 (0.0286)
Open	Post-discussion	0.02 (0.98)	4288.0 (0.0216)

The open CV, pre and post discussion workshops can also be compare on the responses to the payment principle question. Table 6.15 shows that more respondents are willing to pay something in the VW than in the open CV, and more are willing to pay something following the workshop discussion. The number of protest bids is often looked at as a proxy for reliability in CV studies. The valuation workshop approach shows a smaller proportion of protest bids than the open CV approach. This implies that the workshops may be more reliable than the open-ended CV.

However, it is particularly interesting to note the number of "don't know" bids. There is a significantly higher percentage in the workshop than in the open CV, although the number does fall following the workshop discussion. This is of note since the participants to the workshop were given the same amount of information as the open CV respondents. It is difficult to speculate why this might be the case. At the very beginning of the workshop before the participants completed the pre-discussion questionnaire, a very brief introduction was given. They were told "The meeting will be split into three parts. First, completing a questionnaire on your own. Second, splitting into two groups to discuss the project described in the questionnaire, and finally discussing the outcome of the questionnaire." Participants knew therefore that further discussion of the project was going to take place. They may have been waiting to hear further details before making a decision. This conclusion is supported to a limited extent in that two of the people who respondents don't know in the pre-discussion questionnaire, changed to a positive response after the discussion. If participants did not know that a discussion about the project would take place, the outcome may have been different.

It may also have been interesting to subject the valuation workshop results to regression analysis and compare the VW bid curves with the CV bid curves. This would have given some indication of internal consistency of VW responses, such as whether as income increased, WTP increased, and given a basis for further comparison with the CV data. Unfortunately, the sample size of 27 and 29 would not allow for robust regression analysis, although this might prove a fruitful avenue for future research.

Table 6.15. Percentage of different CV bids under different methods

Type of Bid	Open CV	Pre discussion VW	Post discussion VW
Willing to pay something	45.2	50	54.5
Protest bids	8.3	5	5
Genuine zero bids with reason	32.7	11	11
Zero bids with no reason	20.5	0	0
*Don't know bids	13.1	34	30

* this is a sub-category of "Zero bids with no reason"

Some researchers suggest that CV asks the wrong question; that respondents should not be treated as consumers, but rather as citizens who think of the welfare of the community when responding to environmental issues (Sagoff, 1998; Blamey *et al*, 1996). However, Brouwer *et al* (1999) suggests that this overstates the issue and that in reality "individuals are expected to be 'consumers' and 'citizens' simultaneously much of the time" (p343). They state that individuals behave along a continuum rather than in one of two mutually exclusive groups. Analogies between this consumer/citizen continuum can be drawn with the participatory continuum (Table 6.16), where the survey method is represented by CV, the RRA with the valuation workshop and participatory approaches by the citizens' jury. The valuation workshop draws on both survey and participatory methods, and as such participants draw on both consumer and citizen behaviour. This addresses the 'reality' of individual behaviour where personal interests are balanced against community interests. Indeed, the fact that participants only increased their bids after the discussion workshop, may indicate that this balancing act had been taking place during the discussion tasks, and encouraged participants to balance their own personal preferences, against the benefits the project would have for the community at large.

A third area in which CV has been criticised regards equity and distribution. Willingness to pay is based on ability to pay, an issue clearly relevant in the valuation workshop, as 11% stated they could not afford to donate anything. In a CV, these people's preferences would not be considered. However, as the valuation workshop combines the CV with deliberation and discussion, even though the poorer participants get little or no say in the CV, they are able to indicate value in the broader issues which were raised elsewhere in the process. In addition, since the final aggregated value for the project was discussed, these participants had an

opportunity to indicate their thoughts on the overall value of the project as determined by the CV results.

Table 6.16 Consumer/citizen continuum

	Survey (CV)	RRA (VW)	Participatory (CJ)
Mode	Extractive	Extractive	Empowering
Researchers role	Investigator	Investigator	Facilitator
Participants role	Consumer	Consumer/Citizen	Citizen
Methods used	Personal interview	Personal interview, Deliberative, participatory methods	Deliberative, participatory methods

Fourth, Elster (1983) has argued that unsustainable and inequitable choices may be made with CV since it is based on the "thin theory of rationality" which requires only consistency in the expression of preferences (as discussed in Chapter 3). Approaches based on the "broad theory of rationality" which examines not only the consistency of expressed preferences, but also investigate the beliefs and desires behind decisions through rational discussion, lead to more equitable and sustainable decisions. The valuation workshop clearly provides a forum for rationale discussion and an investigation into the beliefs and desires around preferences, and therefore is more likely to develop equitable and sustainable choices.

Finally, the notion of value construction has attracted interest, and suggests that respondents do not have well-defined preferences for policy options prior to the elicitation process in CV, but that these preferences are constructed during the survey itself. Indeed a number of researchers have explicitly attempted to aid respondent's value construction process through a series of steps (Gregory and Slovic, 1997). This process is cumbersome when implemented in a survey, but given the time and format of the valuation workshop, such steps are more easily conducted. Due to the lack of evaluation of the workshop little additional evidence exists to illustrate the role that the discussion tasks played in constructing values, other than that discussed above relating to the clarification of the issue which the tasks seemed to offer. However, there is clear potential in this area.

6.8.2 Discussion of the Valuation Workshop Compared to the Citizens' Jury

The results of the valuation workshop can also be compared with the results of the citizens' jury, however differences in the approaches should be recognised. Table 6.17 shows that time,

the number of participants, and amount of information provided to participants, are crucial differences between the approaches.

Table 6.17 Characteristics of the valuation workshop compared to the citizens' jury

	Citizen Jury	Valuation Workshop
Time	3 days	3 hours
Sample size	11	44
Information provided	Large amounts of information presented by different stakeholders. Jurors can question witnesses, and ask for further information.	Limited information in the form of maps, pictures and text. Participant has opportunity to scrutinise and discuss information with peers.
Main benefits	Participation of local community Deliberative in nature	Both economic estimates and recommendations Relatively inexpensive
Main pitfalls	No economic estimates Representation	Quick and dirty[27] Sample size
Data elicited	Qualitative data on preferences Rankings of environmental characteristics Recommendation on policy	Quantitative data on preferences Qualitative data on preferences Rankings of environmental characteristics Monetary valuation

In the light of these differences, the similarity between the results of the two approaches is remarkable. Many of the benefits of the Ettrick Floodplain Restoration Project identified in the two approaches were comparable. Table 6.18 marries up the benefits from the Ettrick Project as determined by the CJ and the VW (from Table 5.8 chapter 5; Table 6.8 chapter 6). Despite the difference in information provided, many of the issues are similar. It is interesting to note that the VW participants identified more issues than the CJ. For example the VW mentioned tourism, something not seen in the CJ list despite one of the witnesses being a Scottish Borders Tourist Board representative. The jurors did consider tourism but felt that the project was too sensitive, and tourism should not be promoted in that specific area, and therefore did not state it as a benefit. The VW participants were not given such a wide range of environmental information about the project and therefore were not in a position to judge the sensitivity of it. They were only able to identify general benefits, and did not have the further information to hone this list to specifics as the jurors did. This is also true of the access issue. VW participants

[27] As discussed above. Richards (1995) might argue that the valuation workshop was a quick and dirty response to short cut the more reliable and more time consuming approaches used by anthropologists to understand peoples decisions.

felt that promoting wider access to the countryside was a benefit, but not one identified by the jurors. This may also be due to their additional information on the sensitivity of the site, the rarity of such sites gleaned by jurors from witnesses.

Table 6.18 Benefits of the Ettrick Project determined by the CJ and the VW

Benefits identified by the CJ	Benefits identified by the VW
- Preservation of natural ecosystem	- Environment flora and fauna conservation
- education of the young and old	- Social issues i.e. teaching about nature, getting kids involved
- community involvement	- Tourism
- Farming and land management	- decrease the number of sheep and fencing of sensitive areas
- good demonstration scheme for copying	- Public awareness, "Making an attempt"

Having access to more information has also had an impact on the problems discussed. The workshop participants offered a wide range of potential problems in response to their limited information, many of them very similar to the jurors concerns. For example, respondents from both approaches felt that access by visitors was of concern, highlighting the damage that visitors could cause, both on the site and in getting to the site. Both thought that future management of the site could be a problem. The jurors however, had a chance to speak with a variety of witnesses who were able to reassure them about various potential problems, such as future management. They were therefore able to reject a number of concerns based upon the additional information gathered from witnesses.

It is clear that having access to witnesses, allowed the CJ to develop a more practical and realistic lists of benefits and concerns relating to the Ettrick Project. The benefits raised by jurors is less of a wish list than that provided by the workshop participants. The concerns raised by the jurors are more realistic than the worst case scenario, raised by the valuation workshop participants. This finding corresponds to those of Brouwer *et al* (1999) who report that participants at focus groups felt the need to consult with experts before making a decision on the issue under discussion.

These results confirm expectations that level of knowledge (gathered in this case through communication with witnesses) is important in determining preferences and in the outcome of such exercises such as the CJ and VW. Information is crucial. Access to additional information allowed jurors to provide a more focussed and realistic list of benefits, problems and solutions. However, the valuation workshop results are interesting as even though they had access to very

little information the issues they identified were still relevant and accurate especially given the limited time allocated to each exercise. Participatory researchers in developing countries have been keen to point out, in recent years, that local knowledge should not be underestimated in evaluation of environmental projects (Stewart, 1995) and can prove extremely valuable.

The limited time allowed for discussion tasks in the VW may have contributed to the success of the valuation workshop. Participants were encouraged to state their points succinctly, expand on them where necessary and then move on to the next issue quickly. The valuation workshop was less of a consensus and more of an aggregation of participants thoughts on the Project, which sparked others thoughts, but did not foster consensus and a joint decision making. In the jury more time was given to assessing the issues, discussing them, developing a consensus and retaining or discarding issues. It is difficult to determine what motivated participants to the VW to identify those issues they did, but since community issues did feature in their discussions, it can not be assumed that they acted entirely selfishly, as is assumed with CV responses. Further research is clearly needed to determine whether VW participants are acting as consumers or as citizens, a persona that may change throughout the process.

There is evidence from the results to suggests the valuation workshop has been able to address some of the concerns relating to citizens' juries highlighted in Chapter 4. One of the concerns relating to the CJ is that the number of participants is very small. The workshop goes some way to addressing this concern, as it involves more people, and has the capacity to increase the number of people involved by conducting more workshops. This being the case, the valuation workshop approach can be more representative than the CJ.

A second concern was the influence that a dominant member of the group might have in the CJ. This is also a concern in focus groups, where the discussion takes place in a single group. However, the design of the valuation workshop limits the impact that a single person can have, as the groups was split into two for most of the discussion tasks. A dominant person may still have influenced this sub-group, but as each sub-group makes up only one eighth of the workshop approach as a whole, a single dominant person cannot take over the whole process, and significantly influence the outcome.

The replicability of CJs was another concern raised. The valuation workshop in this research was repeated four times (making eight sub-groups for the discussion tasks). The qualitative results from each of these workshops proved remarkably similar. For example, seven out of eight of the groups put financing the project top of their list of concerns; and for all groups, the greatest benefit of the project was its environmental impact. This shows that the method can be

replicated and similar results obtained. Indeed, given greater sample sizes, and consistency in terms of location, the replicability of results could be tested quantitatively.

Finally, one of the problems associated with CJs is the lack of quantitative results. Clearly, the valuation workshop addresses this problem by providing both qualitative and quantitative results. This allows information derived from the valuation workshop to feed into cost benefit analysis – something that CJs have not done, to date.

6.8.3 Discussion of the Valuation Workshop as a Stand Alone Method

One of the most interesting results of the valuation workshop as a stand alone method was the impact of the discussion on the WTP bids. The discussion caused some of the participants to increase their bid, therefore increasing the mean. The total aggregated bid increased by 23% after the discussion from £477,637 to £586,367. Despite this large overall increase, tests (t-tests and Mann-Whitney U) on the pre-discussion and post-discussion mean and median indicate no significant difference. This is somewhat surprising, but seems to correspond to the findings of Brouwer *et al* (1999). It should be noted, however that the sample size was relatively small, and many participants were excluded from the analysis as protest bidders. A number of participants said they would not change their bid because their personal circumstances had not changed, and they could not afford any greater amount.

Interestingly all participants that changed their bid either increased their donation, or changed from a "don't know" to a positive bid. This is despite the fact that they were not provided with any further information about the project and despite the fact that they discussed both benefits and problems associated with the project. Further discussion seems to have improved their perception of the project. One reason for this may have been that problems were discussed alongside potential solutions. Although clearly not all of the solutions were practical, the effect may have been to reduce the significance of the problems. An interesting alternative might be to split the sample, and have one sub-sample identify potential problems but also suggest solutions, and one just to identify problems. The impact of the discussion on the final bid in this case may be different.

The workshop does show that the discussion tasks helped at least two of the participants clarify their preferences with respect to the project, as they changed from "don't know" responses to positive bids. This provides support for the idea that the discussion tasks and deliberation aid the value construction process.

Another interesting aspect of the quantitative results is the participants' reaction and discussion of the final bids aggregated over the Borders population. The overall figure from each workshop was presented to the group for comment. Three very similar types of comments came out of all the workshops. Firstly, the groups felt that the aggregated figure presented was small, and probably did not reflect the value of the project. In each group the sentiment that "nature was priceless" was popular. This reflects evidence from the literature that some proportion of the population are not willing to trade environmental assets with money (Hanley and Milne, 1996).

However, this contrasts with those who did appear to understand the need for a trade-off between money (and other goods) and paying for the project. Such participants felt that although the aggregate figure was small, it was not realistic. Some contrasted having money spent on environmental projects, as opposed to having money spent on other initiatives, for example which may provide jobs in the area. Others looked at it from a private point of view such as the participant who commented "If you have no money, would you spend what little you have left on bread for your kids or on a plant for your garden?" They felt that in the Borders as a whole, there were more important things to spend money on, and the money pledged in the questionnaires would not be realised if a campaign to raise donations were put in place. This argument is backed up by evidence from the literature that when researchers have followed up CV questionnaires with requests for money, actual donations have been less than pledged donations (Macmillan, 1998; Foster *et al*, 1997).

Also associated with comments on not realising the aggregate figure was acknowledgement that households in the Borders who lived further away from the Ettrick Floodplain Restoration Project, might not value project as highly as those who lived closer. This may be confirmed by the valuation results. The workshops were carried out in Hawick and Galashiels, both relatively close to the project site, but Hawick slightly closer. The mean donation of the Hawick workshops (£16.43 and £18.10) were higher than the mean bids of the Galashiels workshop (£11.14 and £5.00). This confirms evidence from the literature that as the distance from the project to be valued increases, WTP falls (Stevens, 1991). This suggests the need for a distance decay function in the process of aggregation, but given the small sample from the two Borders towns, does not provide any guide as to the form of such a function.

Comments were made in this section of the workshop which implied that the participants would have liked more information about the project, in particular about the costs of the project. Brouwer *et al* (1999) found that costs were influential with some participants when assessing

the value attached to a flood alleviation project. Some of the valuation workshop participants clearly wanted to weigh the costs of the project with the aggregate figure presented in order to judge whether the aggregated figure represented what they considered to be the real value of the project. Indeed, some participants went so far as to weigh the possible costs of the project with other capital projects for which they had an idea of the costs, such as road works. This allowed them to see that the aggregated figure was relatively small (compared with the costs), and state that more money was required. Inevitably, this lead to comments that money from such projects should come from the public purse, and not directly from private individuals.

Some interesting results also emerged from the qualitative data obtained. A large number of positive aspects associated with the project were offered, but in some cases these points may have merely reflected the information participants were given about the project in the first instance (see Appendix 1 for the information given in the questionnaire and show cards). For example, the information provided states that "the project aims to restore the area ... to it's natural state" and one of the most commonly mentioned good points was using the area "as nature intended" (Table 6.8). Similarly increasing diversity was considered a benefit of the project, but the information provided to participants made it clear that the project would aim to increase biodiversity (Showcard 3 in Appendix 1). However, with other project benefits discussed it seems clear that the participants had thought about the potential impact of the project and raised new issues. For example, the information given did not discuss educational aspects of the project, but the groups clearly saw this as beneficial; and although farmers were mentioned in the information given in the workshops, no details of the benefits or problems related to farming were made, yet participants raised the positive impact the project would have to farmers in this part of the workshop. This indicates that the groups were not only able to assimilate the information given, but deliberate on it and suggest plausible benefits which might accrue from the project.

Evidence of assimilation and deliberation also exists when the negative aspects of the project were discussed. In the information provided to participants, the only mention of possible pitfalls related to the project is that of finance. In all but one group, the financing of the project was considered the most important problem. Hardly surprising, given the aim of a CV questionnaire, and the fact that they had completed one just before the discussion. Participants were not provided with information on any other problems associated with the project, but were still able to suggest a range of problems, and even offer solutions for them.

Despite this evidence of assimilation of information and deliberation, there are clear instances where the lack of access to further information, and the fact that participants were not able to ask questions of experts, led to unrealistic or unsubstantiated results being generated. For example, a number of the groups suggested that the project may create employment, but they had no way of knowing whether this would be the case or not. Some groups suggested that the project would stop vandalism and reduce litter, but participants had no knowledge of current levels of vandalism or litter, or whether the project would have any impact on these elements. This suggests that the benefits stated may in some ways be a wish list of what participants hoped the project *could* rather than definitely *would* provide.

This is also true for the discussion of problems related to the project. Given limited information, participants could only come up with potential problems, and were not in a position to assess the real nature of problems associated with the project. Participants came up with a very large list of problems, which represented a worse case scenario, but had no data on which to consider and then reject concerns.

Finally, the research reported here provides no evaluation of the approach by the participants. Given a limited amount of time, and both questionnaires and discussion tasks to complete, it was felt that such an evaluation might overload the participants. The participants clearly enjoyed their involvement in the workshop, and the use of participatory methods appeared to have the desired affect in terms of encouraging participants to actively join in, and in stimulating and maintaining interest. However, if such methods are to be used in future, more formal evaluations are essential.

The valuation workshop clearly addresses many of the problems associated with individual survey approaches and participatory deliberative approaches. However, a number of issues arise which require further research. First, providing the participants with the access to one or two experts may improve the process, as issues raised could be further clarified, and this may prevent the development of wish lists, or unsubstantiated concerns. However, this would raise the possibility of bias being introduced by witnesses. Second, in this research, having participants complete discussion tasks led to an increase in some CV bids. The impact of different discussion tasks on the bid should be tested, as different tasks may impact on the direction and magnitude of changes, and ultimately have a significant impact on the final results. Third, given a larger sample size, further test on the quantitative results could have been carried out, to test the validity and consistency of WTP across workshops, and between the workshops overall and the large-scale CV. Finally, although in this research an evaluation of

the valuation workshop would have overloaded the participants, such information would have been useful in further developing the approach.

Despite these problems the valuation workshop shows considerable promise for environmental decision making in the future. The research reported here shows that when involved in carefully designed workshop situations, participants are able to assimilate and deliberate upon a policy question even with a very small amount of information. The discussion allows participants to consider the issue and their preferences towards it. The process may have a role in reducing 'don't know' responses to CV questionnaires; in allowing individuals to take account of both consumer and citizen behaviour; and in providing broader estimates of value of environmental projects. As such the valuation workshop may be a valuable alternative to CV or CJs as a source of information to aid environmental decision-making.

CHAPTER 7

CONTRASTS, COMPLEMENTARITIES AND CONCLUSIONS

7.1 Introduction

Using the contingent valuation method, the citizens' jury and the valuation workshop as three approaches to evaluating a single environmental project highlights theoretical and practical differences. For example, it appears that clear differences exist between the perspective on rationality that CV uses as opposed to the perspective that CJs use. Similarly, in terms of value or preference construction, there appear to be differences between the underpinning notions of each approach. With respect to these issues the different approaches to environmental decision support remain opposed. However, with respect to other theoretical concepts it could be argued that the CV and the CJ are located at two ends of a continuum, with the VW approach locating itself somewhere in the middle as discussed in Chapter 5. These ideas will be explored in section 7.2.

Practical differences also separate the three approaches, which raises the possibility that one approach might be preferred over others in certain circumstances. For example, the citizens' jury is usually set in a context where decision makers respond to the result. This may not be feasible in all situations, and therefore the CJ may not be the appropriate method of evaluation. Section 7.3 compares the practical and procedural elements of the methods with a view to recommending when each may be most appropriate. Of course, in some circumstances the use of more than one approach might be desirable.

The use of the results from each approach is discussed in section 7.4 using those generated from the Ettrick Floodplain Restoration Project CV, CJ and VW as an example. However, the results of the methods need not stand-alone. The potential for utilising results developed from methods used in combination will also be discussed. Section 7.5 assesses the gaps highlighted by the research related to evaluation and valuation of environmental assets. The main weaknesses and omissions from the research are identified in section 7.6. Finally, the chapter and the thesis concludes by drawing out the main findings of the research, and the policy recommendations that come from them.

7.2 Theoretical Similarities and Differences

As discussed in chapters 3 and 4 a number of theoretical ideals are key to the CV, CJ and valuation workshop (VW) approaches. Some might suggest that the difference in these ideals mean that the three methods are conflicting. However, it may be argued that theoretical differences do not mean that the approaches are based on diametrically opposed principles, but that they relate to the location of the approach on a continuum. Chambers (1992) refers to a participatory continuum with extractive survey methods at one end and empowering participatory methods at the other, implying that many approaches lie somewhere in between. Brouwer *et al* (1999) refer to a citizen/consumer continuum, with the individuals acting as consumers at one end and citizens at the other (based on Sagoff's (1988) analysis), but in reality they suggest individuals are somewhere in between, with the two roles not being mutually exclusive. The concept of a continuum rather than conflict or mutual exclusion, is one which could be applied to other theoretical aspects of the CV, CJ and VW methods. In particular, in terms of rationality, and value construction.

Both the CV and CJ methods are underpinned by notions of rationality. Different authors provide different categorisations of rationality which may be applied to different approaches[28]. Instrumental rationality can be defined as "the choice of actions which best satisfy a persons' objectives. These objectives are treated as desires that motivate the individual" (Hargreaves Heap *et al*, 1992 p4). According to some, instrumental rationality has "reigned supreme" (Jiggins and Rolling, 1999, p 442) and is the notion that underpins CV. In this case the end point of the process, the decision, is key (Aldred, 2000). However, the notion of one action or choice satisfying all objectives may not be a good description of human behaviour. Hargreaves Heap *et al* (1992) note that "to be in two minds seems to a recognisable human condition, but it sits uneasily with the instrumental conception of rationality because it appears to deny the existence of well-ordered preferences" (p 16). This implies the need for alternative notions of rationality that may better fit human behaviour.

Habermas (1984) defines two other types of rationality: strategic rationality and communicative rationality. Strategic rationality assumes selfish actors struggle to realise their objectives in a marketplace, by enlisting strategic allies and networks in pursuit of their objectives. Communicative rationality refers to social collaboration and interaction on shared action to reach shared goals (Renn *et al*, 1995; Jiggins and Rolling, 1999). This definition of rationality

[28] However, it could be argued that rationality is about a method of reasoning, and that a process is either rational or irrational. Identifying different types of rationality therefore could be seen as inappropriate. Rather, what is being

clearly emphasises the means as well as the ends in the decision making process and fits with the underpinning notion of rationality in CJs.

Elster (1983) further categorises rationality (as described in Chapter 3) into a thin theory of rationality and a broad theory of rationality. The thin theory examines preferences but does not examine reasons for preferences by assessing beliefs and desires. The only required characteristic of the thin theory is that preferences are consistent. This is contrasted with the broad theory of rationality, which requires more than just consistency in the expression of preferences, but is grounded in the idea of judgement, and requires the examination of beliefs and desires along side the mere expression of preferences. Elster develops these theories of rationality by showing that they may relate to the individual case or the collective case. In the individual case, individual preferences are aggregated to inform decision making. In the collective case, a collective decision making mechanism is activated. These notions are akin to comparisons between CV, CJ and VW as shown in Table 7.1.

Table 7.1 How CV, CJ and VW relate to the theories of Elster and Habermas

Theory of rationality	Collective	Individual
Thin/Instrumental		contingent valuation
Broad/Communicative	citizens' jury	valuation workshop

The thin theory of rationality clearly relates to the CV method, which aggregates individual preferences to inform decision making. The broad theory relates to CJ where collective decisions aim to be a mechanism by which policy is informed. The valuation workshop however, does not easily fit within either the thin individual box; the broad, collective box or broad and individual. The valuation workshop could be seen as an aggregation of individuals preferences with beliefs and desires investigated, and therefore may fit within the individual/broad theory. Time does not allow a collective decision making mechanism in the VW to be developed, but the interaction and discussion does examine judgement.

These descriptions of rationality may not be mutually exclusive, but may form a continuum with a thin instrumental rationality at one end and a broad communicative theory at the other. Although this aspect of Table 7.1 might be seen as a continuum, the mechanism used to collect preferences together i.e. by aggregating individual preferences or by deriving one collective decision, does appear to be mutually exclusive, an issue discussed further below.

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categorised in such definitions is the methods of reasoning, not whether a decision is rational or not.

A second traditionally conflicting, but potentially unifying notion related to CV, CJ and valuation workshop might be that of value construction. There appear to be a number of perspectives on how individual preferences are formed and revealed. First, as discussed in chapter 4, individuals have pre-determined preferences that can and are revealed in well-designed questionnaires (Freeman, 1993; Varian, 1993). In this case CV researchers act as archaeologists uncovering preferences that already exist (Gregory and Slovic, 1997). Second, as discussed in chapter 3, values are assumed not to be predetermined, but are constructed during the elicitation process and depend on the mode of elicitation and the information provided during the process. Following this interpretation researchers act as architects, and help individuals build their preferences, based on clear and defensible principles (Gregory and Slovic, 1997). Finally, a learning perspective might view the construction of preferences as an opportunity for an individual to learn about preferences or value for an asset (Jiggins and Rolling, 1999; Payne *et al*, 1999) and develop preferences in the learning process. CV is traditionally thought to be based on pre-defined preferences. CJ appears to be more in line with the learning perspective, and the VW provides a method which helps to build individuals preferences through given tasks and discussion.

Once again it may be misleading to cast these as mutually exclusive perspectives on how individuals develop preferences. Rather it is conceivable that individuals in some circumstances do have pre-determined values, and yet in others require help in building or learning about them. As with rationality, these perspectives might work together, where preferences are grounded in some pre-determined base, and yet additional help and learning is required to reveal final preferences. O'Connor (1998) cites proof from a number of case studies that "all procedures for eliciting value statements involve simultaneously both discovery and construction" (Chapter 10, p 11).

Of course there are elements of CV, CJ and valuation workshop which cannot be described as part of a continuum, and where a clear dichotomy exists. One such element relates to the way in which individual preferences or judgements are put together to make a decision. Contingent valuation involves aggregation of individual preferences based on the satisfaction of personal objectives. Mitchell and Carson (1989) state "once a contingent valuation survey has obtained the correct theoretical measures for a sample of individuals, the researcher aggregates these values to obtain the total benefits for the good being valued." (p41). The valuation workshop involves the aggregation of preferences in an individual context, just as the CV does, but also investigates the beliefs and desires within a social context where shared goals are discussed (although they may not be the overriding objective, as consensus is not the outcome).

The CJ approach presents an alternative to the aggragative approach, involving a collective decision making mechanism based on preferences, beliefs and desires within a social context with shared goals (ideally) leading to social action. There may be a number of advantages to this deliberative process of social decision making. First, Aldred (2000) points out that given the concept of bounded rationality, where individuals reasoning and decision making capacities are limited and prone to error, dialogue and interaction will involve sharing and understanding ideas and solutions. For complex decisions "many heads will be better than one" (p15). Second, although consensus may be the aim, this may not always be the outcome. Revealing differences or unresolved issues should be viewed as positive and may indicate the broader social problems of interest to society and decision makers (Chambers, 1995, Hargreaves Heap, 1992, Ward, 1999). Ward argues that discursive democracies drive towards consensus is misplaced, as failure to achieve consensus between well-informed individuals is as important a phenomenon as reaching consensus.

Third, some have suggested that public suspicion of CV and CBA relates to the closed nature of the process, and that researchers are able to "cook the books" in order to achieve the outcome desired. Decisions based on social interaction seem to be more transparent and honest (Grove-White, 1997; ESRC 2000). However, others have argued that the CV process is more transparent. The procedures for calibrating estimates are documented and justified, as opposed the CJ decision which is the results of social interaction and dialogue, which does not follow recognised principles, nor must it be justified. Finally, although weights may be applied to CV responses as part of the aggregation process, to account for intra-generational equity, this is seldom done in practice. Equally, discounting of future costs and benefits in cost benefit analysis leads to problems of intergenerational equity in the decision making process. Ward (1999) argues that by ensuring a jury is representative in terms of age, income and so on, there is more chance of both intra-and inter generational sympathy being expressed in the CJ decision making mechanism. However, it would seem that even a representative jury could ignore such issues if they chose.

The decision rule for each method is important. It is usual for contingent valuation decisions to be aggregated over the mean WTP, as was done in this case and as is appropriate for CBA. However some authors argue that more attention should be paid to the median response in a CV survey, as it is unaffected by extreme values. WTP could then be seen as the outcome of a referendum type process, which may be more relevant to some situations. CV studies where the median is zero show that least half of the sample would not vote for the project. A decision on the basis of the mean rather than the median will lead to a different result. In the case of a small

community project, where residents are to be intimately affected, it can be argued that the median (votes in favour of a project) is more relevant than the mean as a decision criterion (Johansson, 1993)[29]. The decision criterion is also important in assessing the CJ and the VW.

Clearly if votes are used in a CJ it is akin to using the median in CV. The CJ may also have a practical role in identifying the median voter. The median voter is identified "by reference to the relation between his or her preferences and the preferences of others, not by reference to the underlying terms in which the ideological space is defined." (Hargreaves Heap *et al*, 1992, p221). The process of public discussion and scrutiny of decisions in the citizens' jury may move the consensus to the middle ground of the median vote. This may provide invaluable information for policy makers as to the view of the typical individual. However, it should be noted that CV provides a quantitative measure of the strength of preference of individual voters, rather than just their direction, information which can be very valuable to policy makers, but which is not provided by a CJ.

Traditionally, an important principle of the CV decision making rule is that it provides objective evaluation of policy options. This implies that policy can be informed by value-neutral analysis from independent social scientists. On the other hand participatory approaches have been viewed as subjective and non-rigorous, not least with respect to their decision making criteria. This notion of subjective versus objective evaluation is a potential source of contention between economic and participatory approaches. However, more recently, as ESRC (2000) point out, the line between objective social science and interest-laden policy decisions has become blurred. Stirling and Mayer (1999) show supposedly objective opinion is embedded in subjective assumptions that reflect individual values. They found that the choices of specialists from different disciplines reflected a range of prior assumptions held by the individual. Slovic (1987) also found that experts responded differently to risk leading to different, but equally rational decisions. The findings of this research suggest that the participatory evaluation approaches traditionally held to be subjective might not be so far removed from the traditionally objective (economic) evaluation methods, since these are also largely subjective.

Despite this argument the decision rules adopted by CV and CJ are clearly opposed. The valuation workshop uses the CV decision rule for the quantitative results, but does not utilise a specific decision rule for the qualitative results. The discussion section of the VW focussed on identifying issues rather than making recommendations. The importance of issues identified

[29] Although this would not be consistent with CBA

was determined by both voting and consensus, but these results were used to provide additional information and explanation of the recommendation determined by the CV.

7.3 Practical Similarities and Differences

As well as discussion of the theoretical issues related to contingent valuation, citizens' juries and valuation workshop, some evaluation of the practical issues should be noted. Table 3.2 (chapter 3) summarised the practical difference between the three approaches.

One of the major difference between the CV and the CJ was the amount of information provided to the respondent. CV respondents were given very limited information (compiled by the researcher) little time to assimilate it, and no time or facility to question it. The jurors were provided with information from a variety of sources, they were able to discuss the information with witnesses and peers, and able to question witnesses to make more sense of the information. There is little doubt that the jurors were given the facility to better understand the project they were being asked to evaluate. This was borne out by the results, with 13% of CV respondents giving a "don't know" answer when asked whether they preferred the area with or without the project. Jurors on the other hand all had definite views on the project. However, there are also issues related to the effect of information and scrutiny on the overall outcome. Evidence from some CV studies suggests that greater amounts of information may reduce the variance of the WTP bids (see chapter 4). It has also been suggested that social deliberation leads to convergence of response (Ward, 1999). Unfortunately this can not be confirmed by comparison of the results of the Ettrick CV and VW as the sample sizes in the VW do not lend themselves to statistical analysis.

Sample size is one of the main practical differences between the approaches. The CV, CJ and VW had around 660, 11 and 44 respondents respectively. This has a number of implications. First, the greater the sample size, the less time is spent with each individual either as a group or individually. This relates to the time each participant is allowed to evaluate the project. Second, the statistical representitiveness of the sample reduces with the number of participants. The CV is more statistically representative of the Borders than the CJ. As discussed in Chapter 5, Crosby (1995) suggests that the CJ can only be symbolically representative of the wider population due to the very small sample size. Some would argue that the focus on a small number of participants leaves approaches open to dominance by individuals, whilst others suggest that it provides a depth and quality of response that is missing from large scale surveys (Jacobs, 1997).

The time spent conducting the evaluation exercise and the number of participants involved influenced the cost of each. This may have an impact on how the methods are used in practice i.e. whether they are used together or individually. Table 7.2 shows the costs of each approach in the Ettrick case (actual costs), which was relatively inexpensive, and in a case where all costs might be included (potential costs). The total cost of the valuation workshop is smaller than the CV and CJ, due to the relatively small numbers involved (compared to the CV) and the short time the workshops took (compared to the CJ). However, the cost of each approach per respondent, participant or juror is also shown. While it is interesting to note that the cost per participants ranges from £8.82 for the CV to £212.72 for the CJ, this does not tell us anything about the cost effectiveness of the approaches, since the relative value of the information provided for decision support in each case is impossible to quantify.

Perhaps one of the most important practical considerations, other than cost, is where the methods are most appropriate. In some circumstances one approach may be preferable to another. According to O'Connor (2000) approaches such as CV, CJ and VW's "answer to different institutional needs, cultural roles and social contexts". However, proponents of CV argue that it has two important features: that due to it's hypothetical nature it is applicable in "almost all contexts", and it may often be the only benefit estimation technique available (Pearce and Turner, 1990). However, there may be circumstances to which CV is not suited.

ESRC (2000) suggest that the special public nature of the environment, uncertainties about natural processes and the effectiveness of policy options, contested expertise and fragile public trust, make environmental decision-making a difficult task. They suggest that new methods may be required, implying that "old" methods such as CV may not be appropriate. Recent experience has shown that reliance on inaccessible social science evaluations has led to publicly unpopular policies, for example, regarding genetically modified foods or BSE (ESRC 2000). In situations where public trust is key, more dialogue with the public may be required to ensure the building of trust. Such situations have shown that the public do require ethical issues to be considered in policy formulation and not merely what might be called "objective scientific realities" (ESRC, 2000). This relates to contingent valuation where the public might consider some attributes of the environmental scenario as having non-anthropocentric value. CV may therefore not be an appropriate tool to evaluate such scenarios.

Table 7.2 Potential and actual costs of the three approaches

	Actual costs (£)	Potential costs* (£)
CONTINGENT VALUATION		
Focus group recruitment @ 250 x3	750.00	750.00
Room hire and refreshments @ 50 x 3	150.00	150.00
Focus group incentives @ £20 per person x 22	440.00	440.00
Focus group facilitator	Na	250.00
Pilot survey costs	Na	750.00
Survey costs @ 5 x 350 (one survey only)	1,750.00	1,750.00
Coding and computer input	Na	100.00
Total Contingent Valuation costs	**3,090.00**	**4,190.00**
Cost per respondents	**8.82**	**11.97**
CITIZENS' JURY		
Participant recruitment	na	250.00
Room hire @ 60 x 3	180.00	180.00
Refreshments @ 8 x 3 x 15	360.00	360.00
Incentive to Jurors @ 130 x 12	1,560.00	1,560.00
Travel costs @ 20 x12	240.00	240.00
Facilitators @£400 per day	Na	1,200.00
Other staff	Na	.
Recording equipment hire	Na	150.00
Total Citizens' Jury cost	**2,340.00**	**3,940.00**
Cost per juror	**212.72**	**358.18**
VALUATION WORKSHOP		
Participant recruitment @ 0.60 x 500	300.00	300.00
Room hire and refreshments @ 50 x 4	200.00	200.00
Incentive to participants @ 20 x 44	880.00	880.00
Facilitators	Na	250.00
Recording equipment hire	Na	150.00
Total Valuation Workshop Costs	**1,380.00**	**1,780.00**
Cost per participants	**31.36**	**40.45**

* figures estimated from personal communication with colleagues and authors own experience

Note: These costs do not include any photocopying or printing costs or staff time in designing and planning each exercise.

It seems clear then that the idea that CV is appropriate in all situations is flawed, especially in the face of complexity, lack of public trust and where ethical issues are involved. However, deliberative approaches such as CJs are equally unsuited to some contexts. Perhaps one of the most important considerations in a CJ (and other participatory approaches) is the raised expectations which goes along with individuals in-depth involvement (Crosby, 1995). Key to the CJ process is the feed back from the policymaker on the recommendations offered by the CJ. Jurors invest time and energy into the process and are keen to ensure their efforts do not go to waste. The sponsoring body must be open to change in response to the results of the jury (Fife Council, 1997). In some situations, this feedback may not be possible or desirable. For example where pure research is being carried out, the context may be entirely hypothetical, and would not be appropriate for a CJ. Other recommendations on when a CJ is not appropriate, as

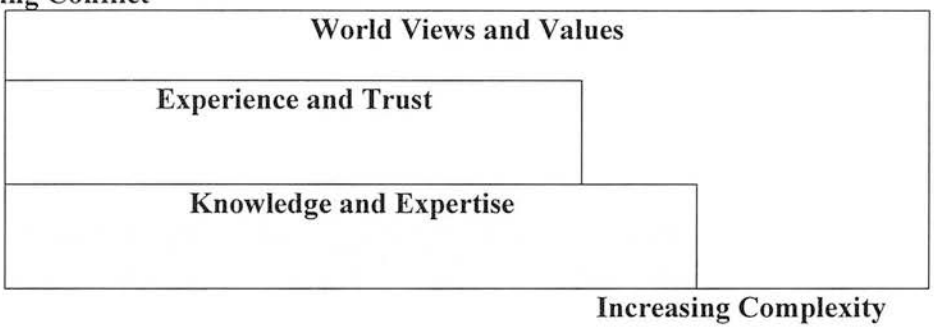
discussed in chapter 5 (Table 5.2) might be when the topic is not absorbing enough (Blamey and James, 1999), when the topic can not be distilled to one key question and when the issue is too large to be tackled and concluded in the time available.

Fishkin (1991) suggests that direct democracy (the basis of deliberative democracy and therefore citizens' juries) approaches are most appropriate on a small geographical scale (Fishkin, 1991). It is at such a level that local populations feel they can and should have influence, as it is with these issues that they are intimately entwined. On a larger scale citizens' juries may not be so appropriate as distant populations may not have the required knowledge of the subject area, nor the required enthusiasm to invest in learning about the subject and contributing to a decision. In such instances, a survey approach may prove more desirable as more people can become involved at very little personal cost in terms of time and effort. Ward (1999) offers a different view suggesting that due to the expense of CJs they should be used only where big issues are at stake, and of "at least regional significance" (p93). He provides two reasons for this: first it may provide a means of increasing citizens' participation beyond merely local issues, and second the expense of a citizens' jury would be worthwhile if the costs of getting the decision wrong were high. This would also increase the importance of the jury and therefore the commitment of the jurors and stakeholders to the process.

The subject matter of the issue for evaluation is clearly key in determining the most appropriate approach for different situations. Renn *et al* (1995) develop a taxonomy for determining when different environmental evaluation approaches might be more suitable. Although the taxonomy they offer relates to different participatory approaches, it can be adapted to evaluate the suitability of economic, participatory, and hybrid approaches, such as the valuation workshop.

Figure 7.1 shows the three concepts involved: knowledge and expertise; experience and trust; and worldviews and values; discussed against a background of complexity and conflict. The first category, knowledge and expertise, involve cases where clear understandings of facts are required, and although trust and values are important, the main debate and solution surrounds expert, local and personal knowledge. The issue may be relatively complex, but the level of conflict is low. In this case CV might be most appropriate.

Figure 7.1 Taxonomy of environmental evaluation methods



Renn *et al* (1995) p 356 and p360

The second level involves more controversial subject matter, and requires public confidence in the decision-making institution. The subject matter may be less complex, but understanding of different interests is required, and consideration of the costs and benefits of the issue necessary. In this situation a VW or CJ may be most appropriate. Finally, some subjects are characterised by high levels of complexity and conflict. Technical competence and openness are required, but in addition the decision may require consensus on issues that underlie the debate. An example might be the continued production of nuclear power in a country. In this case a multi-modal approach would be necessary, perhaps comprising a series of citizens' juries to clarify issues and develop trust, followed by a survey mechanism. None of the approaches alone would suit such a decision, but the combined use of the CJ/VW and CV may fulfil this role.

The results provided by each approach is another difference of note. The CV, VW and CJ methods provide policy relevant information, but information that may be useful in different ways. As well as recommending that the project should go ahead the results of the CJ identify the project needs and how it should develop. Table 5.8 in chapter 5 lists those issues that the jurors felt to be positive, and that might be used as objectives by the managers of the project. Similarly, by identifying concerns relating to the project, jurors provide direction to the managers and policymakers as to the design of the project. The information provided by the jury therefore plays a practical role in directing the management of the Ettrick Floodplain

Restoration Project. A number of the juries' recommendations were taken on board by the managers of the site. The final report was used by both the technical and community steering groups in discussion on the aims and priorities of the project. Second, concerns and recommendations from the jury about public access in the Floodplain Restoration Project were taken forward. In particular, although the jury suggested that information about important wildlife should be provided they suggested that visitors be directed away from sensitive areas. Finally, the Jury report was used by the Borders Forest Trust to illustrate to funders one means by which they have involved the public in their decision making process, as required in the conditions of funding. The process itself was as important as the final recommendations in this regard.

The results of the CV method provided different, policy relevant information. CV is able to measure the intensity of preferences and not just their direction, and provides data that can feed into cost benefit analysis. The CV therefore does not constitute a decision process itself, as results have to feed into a CBA before a decision can be made. This contrasts with the CJ where a full decision is made during the process itself[30]. The benefit of the project estimated by the CV were £448,297 and can be compared with the costs of the project at £335,498. The project does pass the cost benefit test, and shows a potential Pareto improvement. Despite the problems with CBA (O'Connor *et al*, 1998) this type of information has become increasingly important in environmental decision making in recent years, especially as policy makers seek to justify spending with claims of economic efficiency.

The valuation workshop can assess potential Pareto improvements as well as provide guidance to managers as to the development of the project. The CV estimates evaluate the economic benefits of the project, whilst the information generated through the discussion section of the workshop identify the specific benefits provided to local communities, and advise managers of potential problems and solutions. Unfortunately, the small sample size of the VW allows only limited statistical comparisons of the estimates from the CV section with the estimates from the full CV, and reduces the confidence in estimates of aggregated WTP.

7.4 Which Approach Produces the Best Decision?

One crucial aspect of the outputs from each method is whether the decision with one approach is "better" that the decision made by a different approach. This is less important in the Ettrick case, as each method reached the same decision, but this may not always be the case. If the decisions conflict, some guidance on which decision is best is desirable. Evaluation of the final

decision is difficult, as there may be no "right" answer. Criterion typically used to evaluate policy instruments such as economic efficiency, equity and sustainability may provide appropriate measures of the outcome of each method (as discussed below), but do not seem useful for evaluation of the method itself.

The answer to the better decision may therefore lie in assessing the process involved in making the decision, rather than the decision itself. Gambetta (1998) states that discussion (i.e. the CJ and VW) makes for better decisions in four ways. First outcomes are potentially "Pareto superior" as better solutions are offered. Second, better protection for weaker parties leads to fairer decisions. Third, discussion can lead to a greater degree of consensus and finally, decisions developed through discussion are more legitimate (p24). However, Gambetta offers no empirical support for these statements, which perhaps highlights the difficulty in evaluating the outcomes of the three approaches.

Renn *et al* (1995) offer a means by which methods of environmental evaluation can be assessed, which involve three concepts of access, competence and fairness. Table 7.3 shows the components of these three elements, and assesses CV, CJ and VW accordingly. More ticks indicated a better performance under each criterion. The Table reflects the score attributed to each approach in the case of the Ettrick Floodplain Restoration Project, and this may different in other cases.

One concept by which to assess an evaluation approach is access. That is, whether public involvement in the process is restricted or open, or how far along the range the approach is. Access to the CJ by the public is restricted, as jurors are selected from a pool of individuals who respond to a letter sent out randomly. This was even more restricted in the case of the Ettrick project as to be invited onto the jury, people had to have responded to the CV survey. A small number of jurors participate in the process and therefore access to the public at large is restricted. The same can be said for the VW, but since the sample size is larger, access could be said to be slightly less restricted. The CV is more open to the general public. The Ettrick questionnaires were conducted in a public place with a relatively large sample size, which means that the public has a greater opportunity to participate in the process. However, participation depends on chance. The process is not totally open as all those wanting to participate may not be able to.

[30] Although the decision need not be necessarily be taken on board by final policy makers.

Table 7.3 Assessment of the methods

	CV	VW	CJ
Access			
• Restricted / Open	√√√	√√	√
Competence			
• Explicative discourse	√	√√	√√√
• Theoretical discourse	√	√√	√√√
• Practical discourse	-	-	√√
Fairness			
• Shape and agenda	-	-	√
• Rules and moderation	-	-	√
• Discussion	-	√√√	√√√

Adapted from Renn *et al* (1995) p 340

The second evaluative criterion for the approaches is competence, which relates to the development of the best possible understanding of the subject under evaluation. It comprises explicative discourse, theoretical discourse, practical discourse and therapeutic discourse. Explicative discourse requires that the comprehensibility of assertions made in the process are discussed. This includes basic understanding of the language and definitions used. Every method can assume to address comprehensibility of the language as each involved communicating with participants in their own language. The citizens' jury allows for discussion on definitions and terms used, both in literature provided to participants, and in the facility of jurors to ask questions throughout the process. The VW does this to some extent, but with limited time, there is limited ability to fulfil this criterion. The CV does not allow a discussion of definitions in the survey itself, however focus groups conducted before the design of the survey are used to help in comprehensibility as in the Ettrick case, but this may not always work in the survey situation.

The second aspect of competence is theoretical discourse. This is concerned with furnishing participants with objective truths. This may be done through expert information, anecdotal observations, local knowledge and personal experience. The CJ clearly goes a long way in addressing this criterion, as jurors are provided with information from a variety of sources. In

the Ettrick CJ 10 witnesses presented evidence to the jury. Discussion with peers mean that anecdotes and personal experience can be shared to determine objective truths. Due to the provision of far less information in the VW and the CV, these approaches fall short of the ideal under this criterion. The VW could be seen to perform better than the CV as it makes time for local knowledge and personal experiences to be shared, but in neither case are the participants provided with the facility to question and scrutinise the information provided in detail.

Practical discourse involves discussion about social relations, for example about who is most affected by a project. This requires access to different groups of people and interests affected. Once again the CJ allows this to a greater extent than the CV and VW as jurors hear evidence from a variety of witnesses. However the witness selection is made by the managers of the evaluation. Time and expense may prevent full access to all affected. The CV and VW are even more limited. No data on social relations was provided to the participants in the Ettrick study, and no access to different interest groups was allowed in either case. The CV and VW therefore score poorly on the practical discourse criterion.

Therapeutic discourse is a process by which participants are passively encouraged to seek out their own desires, beliefs, experiences and subjectivity. Renn *et al* (1995) argue that "authentic understanding of ones own subjectivity can only be made known to the self through introspection" (p 70). This takes place through discussion and time for personal reflection. Even the CJ only allows this to a limited extent. For example, in the Ettrick case jurors had plenty of breaks in the process giving time for such introspection. The CV and VW do not facilitate this at all, as the participants have little time to consider their responses before offering them for the record.

The third criterion for evaluating the methods is fairness, meaning the equal freedom among participants in the process to act meaningfully. This comprises agenda and rule making, moderation and rule enforcement, and discussion. It is argued that having participants involved in setting the agenda and the rules ensures that their concerns are addressed. In this study, the jury did not have a role in setting the agenda, although it is suggested that jurors could be involved in this aspect of the jury. In the CV and VW the participants had no opportunity to influence the agenda, or the rules of engagement in this process. All the methods in the Ettrick case therefore score poorly under this criterion.

Rules and moderation relate to how the rules are enforced. This may relate for example to how dominant individuals are dealt with in a discussion. This is controlled by the moderator or facilitator, whose behaviour should be open to scrutiny and approval by the participants. In the

Ettrick CJ, participants did not influence this, although had an issue arisen, they may have had a say. In the CV and VW participants had no say in this aspect of the process.

The process should also allow everyone equal opportunity to participate in discussion on any agenda item. This was the case for the CJ and the VW, but not for the CV where no discussion was required, and responses to closed questions were sought. In some ways however, it could be argued that CV scores well on the fairness criterion. Although respondents have no influence over the agenda, rules or discussion, each respondent has the same lack of influence. In participatory approaches much will depend on the moderator and the participants involved. Despite this argument, CV is far from the ideal of including participants in the agenda, rule making and discussion, and this has been reflected in the scores in Table 7.3.

This assessment of environmental evaluation approaches highlights the importance of the decision making process rather than the decision itself, and shows that trade-off between access, competence and fairness in the process are inevitable. The approach leading to the better decision is therefore determined by the subject matter (Figure 7.1) and the needs of the outcome. A simple matter which requires greater access to the process implies the use of CV. A complex subject matter may require a CJ. Subject matter which requires elements of both may use either the VW or use more than one approach.

The methods might also be assessed according to Arnsteins ladder of participation (Chapter 3). This ladder identified degrees of citizen power in decision making[31]. Although the ideal CJ may be located reasonably far up the ladder, for example as far as the "partnership" rung. The CJ reported here was probably in reality an example of tokenism with respect to participation, where citizens were being consulted, but not given any real power. The VW is probably similarly a form of consultation, rather than offering any degree of real power. The CV may also be seen by some as a form of consultation, but by others could be seen as a form of manipulation, i.e. non-participatory.

Both Renn *et al* (1995) and Arnstein (1971) have suggested these frameworks for the evaluation of participatory methods, it may not be surprising then that the CJ scores most highly and the CV poorly. An alternative means to evaluate the methods might be to adopt criteria used to evaluate economic instruments or methods of benefit and damage estimates (OECD, 1989). Table 7.4 draws on the criteria used for such policy instruments to evaluate the CV, CJ and VW. The evaluation of each method of course, is highly subjective and contentious even when

[31] Recall that the rungs of the ladder were (from top to bottom) Citizen control, Delegated power, Partnership, Placation, Consultation, Informing, Therapy and Manipulation.

criteria are suggested. For example, where some might suggest that CV is a simple process, others might argue it is complex; where some might say it is acceptable, because it is used by policy, others might argue it is unacceptable because of its flaws. The score under each criterion may also change in different situations. Table 7.4 evaluates each method according to their use to in the Ettrick Floodplain Restoration Project, relative to the other methods and based on the author's experience and interaction with participants, stakeholders and policymakers.

Table 7.4 Evaluation of methods

	CV	CJ	VW
Cost	high	high	low
Complexity to users	high	low	high
Acceptability	medium	high	low
Scope for institutional capture	medium	high	medium
Accounts for future generations	yes	yes	yes
Information requirements	low	high	low

These three evaluations of the methods highlight the point that there is no general rule as to which method is "better". Decisions on which method to use should be made on a case by case basis, according to the objectives and constraints of the situation. However, evaluations of each method before its use can help in determining whether the method is appropriate in a given situation. In terms of the Ettrick Floodplain Restoration Project, the citizens' jury seems to have been the most "successful" method. In that it met the requirements of the project, by including local communities in the evaluation of the project, and providing indicators of value of the project. The results have also proved popular with policymakers, with proven results in informing environmental policy for the South of Scotland.

7.5 Weaknesses of the Research

Although the research provides interesting results, some deficiencies should be highlighted, with respect to each method individually, and overall. Using the two contingent valuation payment formats provided a comparison between a more widely used format of CV and a lesser used format. However, more could have been done in the design of the questionnaires to better highlight the differences in results. In particular, according to market research, respondents find it easier to choose from a range of possibilities (as in the interval CV format) than respond to an

open question. Some CV researchers have included questions in the survey which directly evaluate the questionnaire. For example, Mourato and Pearce (1999) included a question as to whether respondent felt the questionnaire was boring, and found responses to this question significant in the subsequent analysis. An evaluation of the questionnaire may have been useful in determining respondent's views on each format.

As discussed above the information provided in a CV is important. Although the information presented to respondent was tested and modified following focus groups, it appears that it may not have provided respondents with enough detail to make a decision. Two outcomes suggest that respondents needed more or better information, or more time to assimilate it. First, 13% of respondents in the CV respondents said they did not know if they preferred the site with or without the project. Second, there were a large number of 'don't know' and non responses to the valuation question, which implies that respondents were not able to determine their preferences well enough to decide whether to pay. This high number of 'don't know' responses implies some problems with the CV which were not picked up in the pilot stage. Further piloting of the CV may have helped identify design problems, which lead to the large number of 'don't know' and non responses. Further information presented to respondents may have been useful to avoid such problems.

A number of deficiencies can also be identified with the citizens' jury. First, due to the practical circumstances at the time, the jury dealt with two related issues in the Borders: the development of the Southern Upland Initiative and the Ettrick Floodplain Restoration Project. This was necessary since the Ettrick Project was already going ahead, and although juror's recommendations could address the future management of the site, they could not affect whether it happened. Stakeholders were interested in the jury input to the management of the Ettrick site, but were also at the time involved with consultation on whether or not to implement the Southern Upland Initiative, and were keen to have this included in the jury. According to the juror's evaluation, the two issues were confusing on the first day, but as time progressed, the task for the jury was clear. In an ideal world the jury would have been asked to consider just the Ettrick Floodplain Restoration Project, but unlike a CV, a CJ does not deal with hypothetical situations, and the use of the two issues was required to ensure decision makers became involved in the process and to ensure that the jury recommendations were heeded by the decision makers.

Although 15 people were invited, and agreed to attend the jury, in the end only 11 completed the whole process, due to a variety of reasons including bad weather and illness. Between 14

and 16 participants is an ideal number, but was not achieved in this case. With some people dropping out the composition of the jury changed, for example there were more women than men. The jury seemed to be well-balanced in terms of views and opinions despite this, but it is impossible to say whether the outcome would have changed had all those invited attended.

The main shortcoming of the valuation workshop was the sample size as discussed above. Given there are no guidelines to follow with this method, changes in the format may produce interesting results. This will be discussed below, in the "further research" section.

7.6 Recommendations for Further Research

The results from all three approaches appear to endorse the Ettrick Project, and agree that the project is of value to the Borders community. The CV and CJ clearly provide different, but complementary information for the decision-maker. However, in many instances where rural project evaluation is required, conducting both a CV and CJ would be prohibitive in terms of time and money. The challenge for the future may therefore lie in developing complementarity. Building on the valuation workshop design, and increasing the sample sizes may go further in offering a more appropriate combined approach, so that decision makers can benefit from both forms of policy relevant information when evaluating environmental projects.

As it stands the CJ provides complementary information to the CV, however, some authors have suggested that CJs can be used explicitly to put a monetary value upon environmental assets (Common, 1998; Ward, 1999). For example Common suggests that juries could be asked a question along the following lines "Company X wants to proceed with a project, the environmental impact assessment for this indicates the following environmental impacts.....which could be threats to sustainability in that ..... If the project does not go ahead, the costs to society would be ..... Should the project be allowed to proceed?" (p 17). Similarly, Ward suggests that jurors should be asked to express not what the environment is worth to them, but what it is worth to society or even for the community of the earth. The use of valuation within a citizens' jury framework has yet to be fully explored, and is a particularly interesting topic for further research.

The valuation workshop shows potential in providing aggregated economic values and wider indicators of value. In particular, one aspect of the VW which may be useful is the discussion on the aggregated value of the project. This discussion was cut short in the VWs reported here, however, some interesting comments were forthcoming. Greater emphasis on this aspect of the workshop, to the extent that participants be allowed to adjust the aggregated value would be an

interesting focus. This provides an alternative to the CJ determining value as discussed above, as the discussion would be based on participants own consumer values (from the CV) rather than being based on a discussion of costs and benefits as suggested by Common (1998). Investigation into the consistency of such adjusted values between groups would also providing interesting insights into the scope for wider use of the valuation workshop.

The valuation workshop might also be developed by including the facility for the participants to question and scrutinise the information provided, which would allow more refined and honed responses in terms of benefits, problems and recommendations. This might fit into the VW framework by including a short presentation by two witnesses (from different sides of the debate) and allowing the participants to question them about the project. The VW approach does show promise in looking at projects from a number of different angles, drawing out differences, whilst at the same time providing economic estimates of the benefit of an environmental project.

Some empirical research has already taken place into understanding when consumers behave as citizens and when they behave as consumers (Burgess *et al*, 2000; Russell *et al*, 1999). The CJ and VW provide scope for further research in this area. Although researchers have tried to test when people behave as consumers as opposed to citizens, and tried to trigger responses from a particular standpoint, little research has been done into participant's thoughts on how different components should be valued. A participatory approach might allow participants to determine when the consumer "hat" is most appropriate and when the citizens' "hat" is best, and value a project on this basis. The resulting value may be different to the value (but perhaps more valid) obtained in a more traditional way.

In an ideal situation participatory approaches would formulate the final decision[32]. This contrasts with economic approaches which have to feed into further analysis before a decision can be taken. However, in this research the outputs of each of the methods (including the participatory ones) were used to inform policy rather than determine policy. This distinction is crucial in the eyes of the participatory democracy theorists, who would argue that institutions should be put in place which actually allow citizens to make policy decision. It is difficult to see this taking place in the UK political environment, and as such the participatory approaches developed in this research are lacking one of the fundamental ideals of participatory democracy. However, given practical and political realities, it could be argued that the citizens' jury is as close to the ideal as such approaches will get in the UK today.

[32] From a democratic theory perspective.

Finally, the issue of value construction is one to which a more participatory approach may be able to provide insights. Although the tasks in the CJ and the discussion in the VW provide some indication of the construction process there is clear scope to better trace the construction of preferences and the role the researchers has in influencing them. This might involve providing different information to different sub-samples to a VW, designing discussion tasks to illustrate participants thought process, and assessing differences in results.

7.7 Conclusions

Economic approaches to aid environmental evaluation have increased in popularity in recent years, and the provision of economic estimates have proved useful in the decision making process. However, the flaws in the approach have also been recognised. Given these flaws and the increasing complexity and uncertainty of environmental issues, complementing monetary estimates with other indicators of value or public opinion is essential. This research has shown that the CJ and VW can address some of the issues with which CV struggles. Using the CJ rather than the CV replaces the ill-informed, ill-constructed quantitative preferences of consumers with the well-informed, well-constructed qualitative values of citizens. Using both approaches provides a desirable balance between the two outcomes, but at a potentially prohibitive cost. Further development of the VW may lead to an approach that offers a balance in an efficient and effective way.

Participatory approaches have merits other than merely addressing problems of CV. The wider indicators of value drawn out by these approaches and the differences between participants is also important. Evidence shows that public preferences and opinions cannot always be measured in purely monetary terms, as attributes other than efficiency (such as ethics and community) are considered crucial. Alternative approaches to evaluation such as CJ and VW can assess the importance of these issues. These alternative approaches also have other strengths. Consumers in CV are seen as a homogeneous group, whose preferences can be easily aggregated, however, society comprises a range of different groups, with different backgrounds, beliefs and desires. These differences need to be accounted for. Participatory approaches may be one means by which diversity can be explored to inform policy and ensure policy meets the needs, and gathers support from a diverse society. ESRC (2000) suggest that trying to win support for an official policy with a single message is mistaken. The CJ and VW go some way to offering an approach, which evaluate an overall policy option but which also identify diversity, to inform policy.

Wider indictors of value are particularly important in the face of relatively small mean CV estimates, as found in this study. In the past CV appears to have worked to promote environmental considerations, and conserve natural resources. However, monetary estimates will not necessarily ensure environmental sustainability. Perrings and Common (1992) show that economic arguments such as the correction of market failure are not sufficient for sustainability. Inclusion of societies beliefs and desires into the decision making process alongside monetary estimates may ensure environmental sustainability even when monetary estimates may not provide a rationale for environmental conservation or enhancement.

Finally, this research has shown that economic and participatory approaches are not as mutually exclusive as might be anticipated. Of course, some issues cannot be resolved, such as whether aggregation or consensus is the most appropriate decision making criterion. However, on other issues CV and other participatory approaches do not occupy mutually exclusive positions, but are located at different points along a continuum. Respondents or participants may reflect these different locations depending on the circumstances at hand. The fact that they do not occupy mutually exclusive positions is key if future environmental evaluation methods continue developing complementarity between methods, in the search to improve information provided to policy makers. The valuation workshop allows the strengths of the CV approach and the participatory to be combined. Comparisons of the VW to the CV and the CJ have shown the validity and potential of this approach. The development of this type of approach is sure to be central to the future of environmental evaluation.

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Appendix 1

Open ended contingent valuation questionnaire

Interval contingent valuation questionnaire

Showcards and information

Job Name: **Borders**
Job No: **8133**

Open Ended Questionnaire

Field Focus

Progressive Partnership Ltd
Thain House, 226 Queensferry Rd, Edinburgh, EH4 2BP
Tel: 0131 315 3113 Fax: 0131 315 3115
e-mail: info@progressive.almac.co.uk

Classification

Age		Gender		Location	
Under 25	1	Male	1		1
25 - 34	2	Female	2		2
35 – 44	3				3
45 – 54	4				4
55 – 64	5				
65 +	6				
Occupation of chief wage earner		Social Class		Education Level	
Position		AB	1	'O' level / 'O' grade	1
_____		C1	2	Higher level	2
_____		C2	3	Certificate / Diploma	3
Industry		D	4	Degree	4
_____		E	5	Post graduate degree	5
_____				Other_____	6
		Household			
		Income bracket			
		Less than £5000	1		
		£5001 - £10000	2		
		£10001 - £15000	3		
		£15001 - £20000	4		
		£20001 - £25000	5		
		£25001 - £30000	6		
		£30001 - £40000	7		
		More than £40000	8		

Interviewer's Declaration
I declare that I have carried out this interview in full, in accordance with the instructions and briefing material from Field Focus Research.

Interviewer's Signature_____ Date: _____
Print Name:_____

Respondent's Name:_____ Address: _____

_____

Phone: _____ _____

Introduction: Good morning/afternoon I am..... from Field Focus Research an independent research company, who are carrying-out a survey on Public Attitudes to Environmental Management in the Borders Region . It will only take a few minutes.

The Scottish Agricultural College and the University of Edinburgh are conducting some research on management of the countryside in Scotland. Would you mind answering a few questions about your attitude towards the countryside in the Borders Region of Scotland.

Q1.

Do you participate in any outdoor activities?

	Code	Route
Yes	1	Q2
No	2	Q3

Q2.

Which of the following activities do you participate in?

Showcard A	Code
(Hill) walking	1
Field sports	2
Caravaning	3
Camping	4
Gardening	5
Cycling	6
Fishing	7
Watching wildlife	8
None	9
Other (specify)_____	A

Q3.

Which of these statements best applies to you?

Showcard B	Code	Route
I am a resident of the Borders	1	Q4
I am a day visitor to the Borders	2	Q5
I am a holiday maker in the Borders	3	Q5
None of the above	4	Q5

Q4.

How long have you lived in the Borders?

Showcard C	Code
Less than 2 years	1
3 – 5 years	2
6 – 10 years	3
11 – 15 years	4
16 – 20 years	5
More than 20 years	6

Q5.

How would you describe the physical environment in which you were brought up?

Showcard D	Code
Near the centre of a town	1
On the outskirts of a town	2
Near the centre of a city	3
On the outskirts of a city	4
In the countryside, but close to a town/city	5
In the countryside along way from a town or a city	6

Q6. How would you describe the physical environment in which you live now?

Showcard D	Code
Near the centre of a town	1
On the outskirts of a town	2
Near the centre of a city	3
On the outskirts of a city	4
In the countryside, but close to a town/city	5
In the countryside along way from a town or a city	6

Q7. I am now going to read out a number of statements and would like you to tell me how strongly you agree / disagree with each. **Showcard E**

Tick start and rotate Read out	Agree strongly	Agree slightly	Neither / Nor	Disagree slightly	Disagree strongly
The balance of nature is very delicate and easily upset by human activities	1	2	3	4	5
The earth is a planet with only limited room and resources	1	2	3	4	5
Plants and animals do not exist primarily for human use	1	2	3	4	5
Modifying the environment for human use seldom causes serious problems	5	4	3	2	1
There are no limits to growth for nations like the UK	5	4	3	2	1
Humankind was created to rule over the rest of nature	5	4	3	2	1

READ OUT & SHOWCARD

I would like to ask you about a specific environmental project which may be undertaken in the Ettrick valley. The project aims to restore the area shown on the map to its natural state - a forest floodplain. (**Showcard 1**) Floodplain forest habitats are among the richest ecological systems, but most have now disappeared from Britain. Protection and expansion of this area would ensure the survival of this ecological system and protect many species of bird, plant and animal.

Currently much of the area is covered with conifer plantation, and rough grazing for sheep and cattle (**Showcard 2**). Although these types of natural habitat would still be found widely throughout the region, the project would create a 150 hectare area (equivalent to about 230 football pitches) consisting of a number of different habitats such as wooded wetland, wetland, deciduous woodland, and haymeadow along a stretch of the Upper Ettrick.

The chart (**Showcard 3**) shows which natural habitats are present in the area now, and what will be there if the project goes ahead. The project would not change the types of land use in areas outside the project site, and would go ahead with the consent of the affected farmers.

The change in the type of natural habitat which the project would promote would ensure that certain rare species such as otter, are protected, and may also encourage new species, such as osprey, to the area. Access to all of the natural habitat created by the Ettrick floodplain project would be open to all.

Q8.

	Code	Route
Do you prefer the site with or without the project?		
With	1	Q9a
Without	2	Q9b
Don't know	3	Q10

Q9a. Can you say why you prefer that option?

Go to Q10

Q9b. Can you say why you prefer that option?

Go to Q10

Q10.

	Showcard F	Code
If the project went ahead, how likely would you be to visit the Ettrick Valley?		
	Very likely	1
	Quite likely	2
	Not very likely	3
	Not at all likely	4
	Unsure	5

Q11.

	Code	Route
Have you visited the Ettrick Valley in the last year?		
Yes	1	Q12
No	2	Q13
Don't know	3	Q13

Q12.

	Code
How many times have you visited in the last year?	
Once	1
2 – 3 times	2
4 – 5 times	3
6 – 10 times	4
More than 10 times	5

Q13. Some of the money to pay for the project may be available through European and government funding, but if the project is to go ahead, a large amount must be raised by donations from the public. Unless sufficient funds could be raised by public donation, the project would not go ahead. This money could be raised by setting up a community trust fund which would help pay for the management of the site. If a fund were set up to raise money for this project, would you be willing to make a donation into it?

	Code	Route
Yes	1	Q14
No	2	Q15
Don't know	3	Q16

Q14. How much money (on a once only basis) would your household be willing to donate to the fund in order to ensure this project went ahead? Please bear in mind that this money would only go towards paying for management of the natural environment in the Ettrick valley. You might also like to think about the spending on other items you might have to give up if you did make this payment.

£_____

Go to Q16

Q15.

Why you would not be willing to make a contribution?

	Code
Cannot afford to	1
I would rather give to other charities	2
I do not like the project/environment	3
I would not visit the area	4
Some other body should be responsible for paying	5
Other (specify)_____	6

READ OUT

Q16. If enough money were raised from public donation for the project to go ahead, there are a number of habitat types that these funds could be used to improve. We would like to know which natural habitats you think the money should be spent on. If you were given 100 tokens to distribute amongst the natural habitats shown in the pictures, how would you allocate these tokens between them? For example, **(Showcard 4)** if you prefer grazing fields and conifer plantations to the other natural habitats you might allocate more tokens to them, say 30 each. You might quite like deciduous woodland and allocate 20 tokens to them, you may not like wetland or wooded wetland very much and allocate only 10 tokens to those habitats. You may not like haymeadow at all and therefore allocate no tokens to that natural habitat.

	Tokens		**Tokens**
Grazing fields	_____	Wetland	_____
Conifer plantation	_____	Wooded wetland	_____
Deciduous woodland	_____	Haymeadow	_____

Q17. Here is a list of countryside issues which concern people living and visiting the Borders. I would like you to **rank** their importance, where 1 is most important , the next most important is number 2, and so on. You should give the issue you think is least important, number 5. **(Show card 5)**.

	Rank
Pollution / pesticides	
Housing	
Transport	
Protecting wildlife	
Protecting rural jobs	

Q18.

Are you a member of any environmental or community groups, such as the RSPB, Friends of the Earth or the local community council, or any similar organisation?

	Code	**Route**
Yes	1	Q19
No	2	Q20

Q19. Which group(s):

_____

Q20. **THIS QUESTION SHOULD ONLY BE ASKED IF RESPONDENTS ANSWERED Q14.**
You said earlier that your household would be willing to pay **£? (Read out amount stated in Q14)** into a community trust fund to help pay for the project in the Ettrick Valley. Can you say how you decided upon that figure?

_____

_____

Q21.

If you were asked to donate that amount tomorrow, would you do so?

	Code	**Route**
Yes	1	close
No	2	Q22

Q22. Can you say why not?

_____

_____

_____

Thank and close

Job Name: Borders
Job No: 8133

Interval Questionnaire

Progressive Partnership Ltd
Thain House, 226 Queensferry Rd, Edinburgh, EH4 2BP
Tel: 0131 315 3113 Fax: 0131 315 3115
e-mail: info@progressive.almac.co.uk

Classification

Age		Gender		Location	
Under 25	1	Male	1		1
25 - 34	2	Female	2		2
35 – 44	3				3
45 – 54	4				4
55 – 64	5				
65 +	6				
Occupation of chief wage earner		Social Class		Education Level	
Position		AB	1	'O' level / 'O' grade	1
_____		C1	2	Higher level	2
_____		C2	3	Certificate / Diploma	3
Industry		D	4	Degree	4
_____		E	5	Post graduate degree	5
_____				Other_____	6
		Household			
		Income bracket			
		Less than £5000	1		
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Which of these statements best applies to you?

Showcard B	Code	Route
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How long have you lived in the Borders?

Showcard C	Code
Less than 2 years	1
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6 – 10 years	3
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16 – 20 years	5
More than 20 years	6

Q5.

How would you describe the physical environment in which you were brought up?

Showcard D	Code
Near the centre of a town	1
On the outskirts of a town	2
Near the centre of a city	3
On the outskirts of a city	4
In the countryside, but close to a town/city	5
In the countryside along way from a town or a city	6

Q6.

How would you describe the physical environment in which you live now?

Showcard D	Code
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On the outskirts of a town	2
Near the centre of a city	3
On the outskirts of a city	4
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In the countryside along way from a town or a city	6

Q7. I am now going to read out a number of statements and would like you to tell me how strongly you agree / disagree with each. **Showcard E**

Tick start and rotate Read out	**Agree strongly**	**Agree slightly**	**Neither / Nor**	**Disagree slightly**	**Disagree strongly**
The balance of nature is very delicate and easily upset by human activities	1	2	3	4	5
The earth is a planet with only limited room and resources	1	2	3	4	5
Plants and animals do not exist primarily for human use	1	2	3	4	5
Modifying the environment for human use seldom causes serious problems	5	4	3	2	1
There are no limits to growth for nations like the UK	5	4	3	2	1
Humankind was created to rule over the rest of nature	5	4	3	2	1

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I would like to ask you about a specific environmental project which may be undertaken in the Ettrick valley. The project aims to restore the area shown on the map to its natural state - a forest floodplain. (**Showcard 1**) Floodplain forest habitats are among the richest ecological systems, but most have now disappeared from Britain. Protection and expansion of this area would ensure the survival of this ecological system and protect many species of bird, plant and animal.

Currently much of the area is covered with conifer plantation, and rough grazing for sheep and cattle **(Showcard 2)**. Although these types of natural habitat would still be found widely throughout the region, the project would create a 150 hectare area (equivalent to about 230 football pitches) consisting of a number of different habitats such as wooded wetland, wetland, deciduous woodland, and haymeadow along a stretch of the Upper Ettrick.

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Q8.

Do you prefer the site with or without the project?

	Code	Route
With	1	Q9a
Without	2	Q9b
Don't know	3	Q10

Q9a. Can you say why you prefer that option?

_____

_____

_____

Go to Q10

Q9b. Can you say why you prefer that option?

_____

_____

_____

Go to Q10

Q10.

If the project went ahead, how likely would you be to visit the area?

Showcard F	**Code**
Very likely	1
Quite likely	2
Not very likely	3
Not at all likely	4
Unsure	5

Q11. Some of the money to pay for the project may be available through European and government funding, but if the project is to go ahead, a large amount must be raised by donations from the public. Unless sufficient funds could be raised by public donation, the project would not go ahead. This money could be raised by setting up a community trust fund which would help pay for the management of the site. If a fund were set up to raise money for this project, would you be willing to make a donation into it?

	Code	Route
Yes	1	Q12
No	2	Q13
Don't know	3	Q14

Q12. How much money (on a once only basis) would your household be willing to donate to the fund in order to ensure this project went ahead? Please bear in mind that this money would only go towards paying for management of the natural environment in the Ettrick valley. You might also like to think about the spending on other items you might have to give up if you did make this payment.

Under £5	1
£6-£10	2
£11-20	3
£21-30	4
£31-40	5
£41-50	6
Over £50	7

Q13.

Why you would not be willing to make a contribution?

	Code
Cannot afford to	1
I would rather give to other charities	2
I do not like the project/environment	3
I would not visit the area	4
Some other body should be responsible for paying	5
Other (specify)_____	6

READ OUT

Q14. If enough money were raised from public donation for the project to go ahead, there are a number of habitat types that these funds could be used to improve. We would like to know which natural habitats you think the money should be spent on. If you were given 100 tokens to distribute amongst the natural habitats shown in the pictures, how would you allocate these tokens between them? For example, **(Showcard 4)** if you prefer grazing fields and conifer plantations to the other natural habitats you might allocate more tokens to them, say 30 each. You might quite like deciduous woodland and allocate 20 tokens to them, you may not like wetland or wooded wetland very much and allocate only 10 tokens to those habitats. You may not like haymeadow at all and therefore allocate no tokens to that natural habitat.

	Tokens		**Tokens**
Grazing fields	_____	Wetland	_____
Conifer plantation	_____	Wooded wetland	_____
Deciduous woodland	_____	Haymeadow	_____

Q15.

Have you visited the Ettrick Valley in the last year?

	Code	Route
Yes	1	Q16
No	2	Q17
Don't know	3	Q17

Q16.

How many times have you visited in the last year?

	Code
Once	1
2 – 3 times	2
4 – 5 times	3
6 – 10 times	4
More than 10 times	5

Q17. Here is a list of countryside issues which concern people living and visiting the Borders. I would like you to **rank** their importance, where 1 is most important , the next most important is number 2, and so on. You should give the issue you think is least important, number 5. **(Show card 5)**.

	Rank
Pollution / pesticides	
Housing	
Transport	
Protecting wildlife	
Protecting rural jobs	

Q18.

Are you a member of any environmental or community groups, such as the RSPB, Friends of the Earth or the local community council, or any similar organisation?

	Code	Route
Yes	1	Q19
No	2	Q20

Q19. Which group(s):

_____

Q20. We would like to carry out some more detailed work on public opinion of this project in the Borders Region of Scotland. Would you be willing to attend a group session to be held in your local area, to talk about this in greater detail?

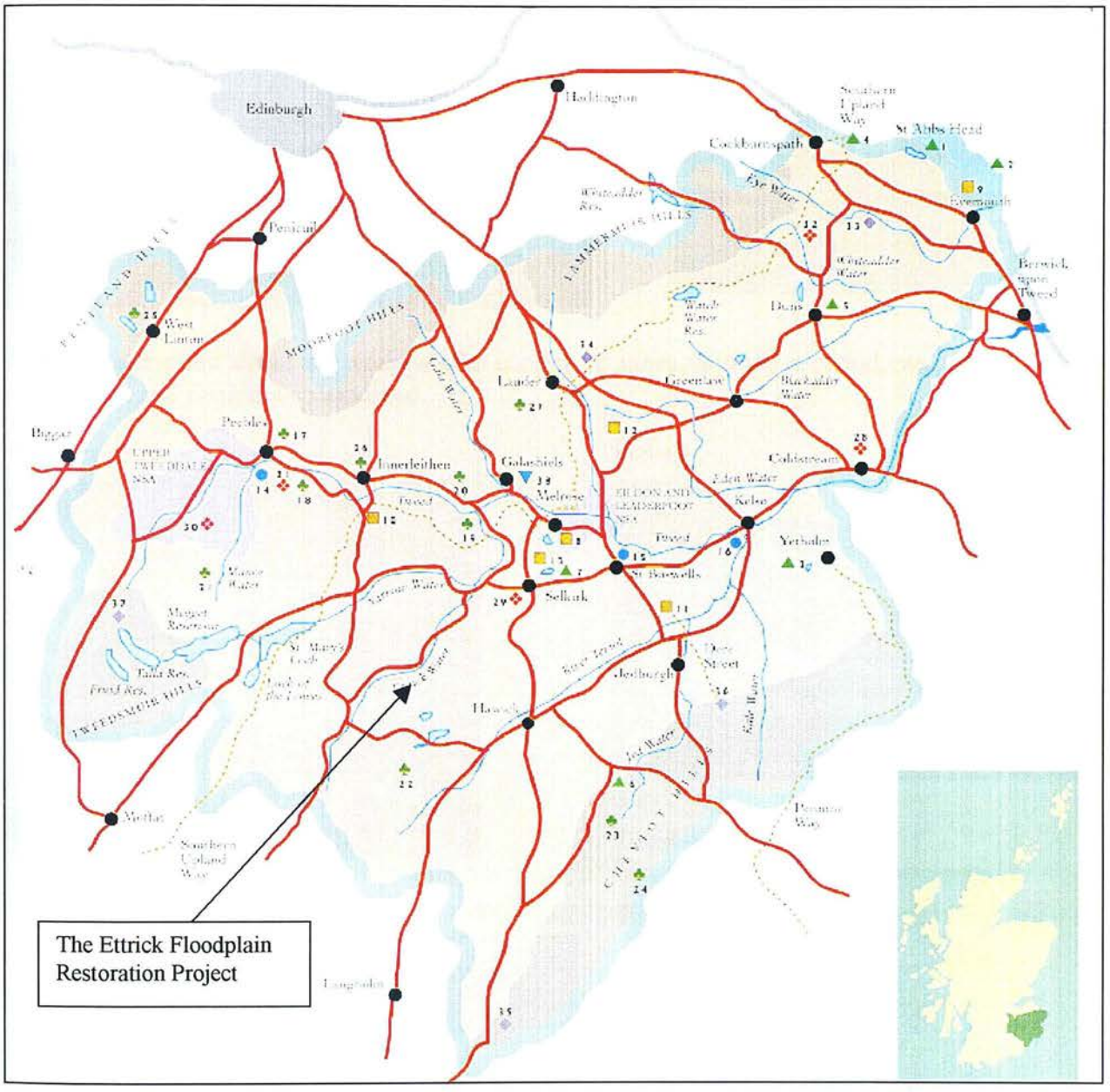
Yes	1
No	2

Thank and close

Showcards and Information

Showcard 1

The map shows the location of the proposed project.



Showcard 2

At present, much of the land in the project area is covered with conifer plantation and rough grazing for sheep and cattle.

Conifer plantation

Sheep and cattle grazing

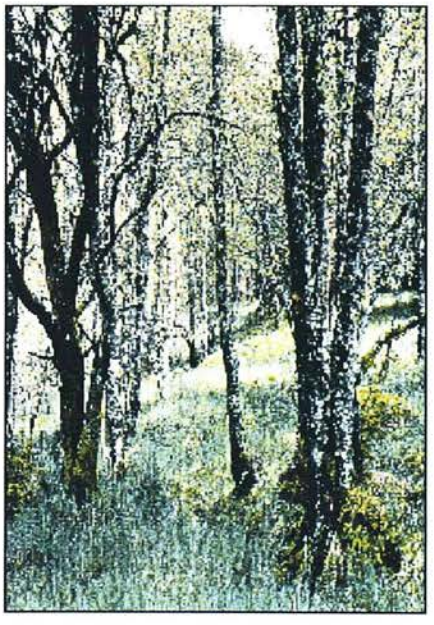
If the project goes ahead the area would consist of more wooded wetland, wetland, haymeadow and deciduous woodland.

Wooded wetland

Wetland

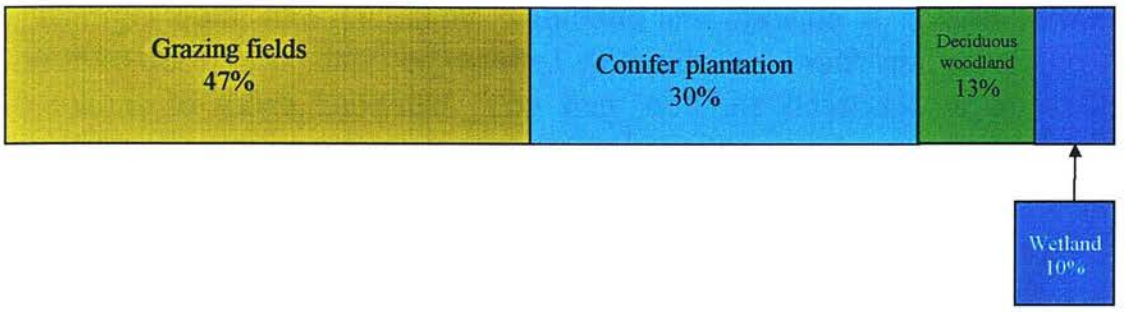
Haymeadow

Deciduous woodland

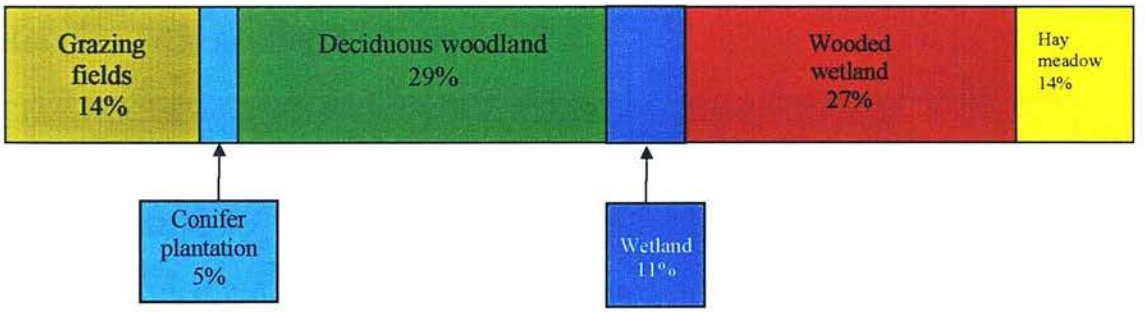


Showcard 3

The type of natural habitats present at the project site now.



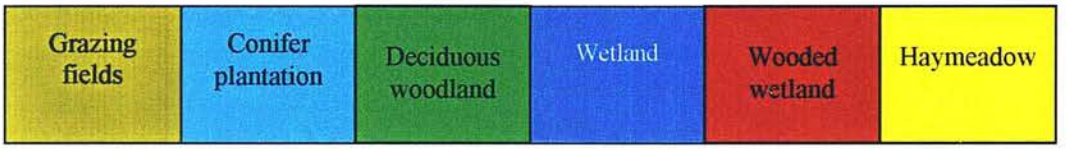
The type of natural habitats that would be present at the project site if the project went ahead.



Most of the land close to, but outside the project site would still be used as farmland or for conifer plantation. Farmers would be compensated if the project had an impact on their land.

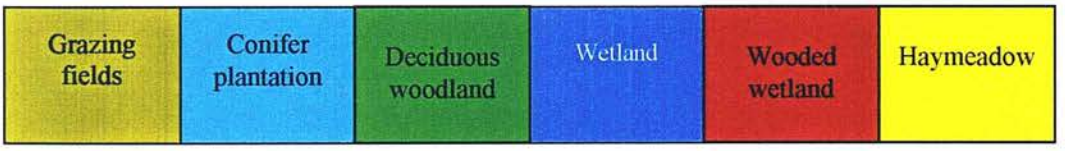
Showcard 4

For example, if you prefer grazing fields and conifer plantations to the other natural habitats you might allocate more tokens to them, say 30 each. You might quite like deciduous woodland and allocate 20 tokens to them, you may not like wetland or wooded wetland very much and allocate only 10 tokens to those habitats. You may not like haymeadow at all and therefore allocate no tokens to that natural habitat.



30 tokens | 30 tokens | 20 tokens | 10 tokens | 10 tokens | 0 tokens

How would you allocate the tokens?



___tokens | ___tokens | ___tokens | ___ tokens | ___tokens | ___ tokens

Appendix 2

Statistical Output

POOLED DATA

Link Function: Logit

Logistic Regression Table

Predictor	Coef	StDev	Z	P	Odds Ratio	95% CI Lower	95% CI Upper
Constant	-0.9501	0.4021	-2.36	0.018			
LOGINC	-0.04167	0.01908	-2.18	0.029	0.96	0.92	1.00
AGE2	0.011958	0.005390	2.22	0.027	1.01	1.00	1.02
Q16DECID	0.012927	0.005018	2.58	0.010	1.01	1.00	1.02
Q2	0.10322	0.04937	2.09	0.037	1.11	1.01	1.22
Q17TRANS	-0.10947	0.06373	-1.72	0.086	0.90	0.79	1.02
Q17JOBS	-0.13634	0.07560	-1.80	0.071	0.87	0.75	1.01

Log-Likelihood = -416.436
Test that all slopes are zero: G = 27.696, DF = 6, P-Value = 0.000

Goodness-of-Fit Tests

Method	Chi-Square	DF	P
Pearson	675.405	670	0.434
Deviance	803.053	670	0.000
Hosmer-Lemeshow	16.653	8	0.034

Binary Logistic Regression
Link Function: Normit

Logistic Regression Table

Predictor	Coef	StDev	Z	P
Constant	-0.5937	0.2420	-2.45	0.014
LOGINC	-0.02464	0.01157	-2.13	0.033
AGE2	0.007227	0.003233	2.24	0.025
Q16DECID	0.007889	0.003047	2.59	0.010
Q2	0.06170	0.02989	2.06	0.039
Q17TRANS	-0.06485	0.03828	-1.69	0.090
Q17JOBS	-0.08017	0.04490	-1.79	0.074

Log-Likelihood = -416.535
Test that all slopes are zero: G = 27.498, DF = 6, P-Value = 0.000

Open Ended Data

```
--> tobit;Lhs=q14;Rhs=one,q10,q8,q18,loginc$
```

```
+------------------------------------------------------------------------+
| Limited Dependent Variable Model - CENSORED   Regression               |
| Ordinary    least squares regression    Weighting variable = none      |
| Dep. var. = Q14       Mean=   13.18103448    , S.D.=   69.71172542     |
| Model size: Observations =     232, Parameters =   5, Deg.Fr.=    227  |
| Residuals:  Sum of squares= 1083366.215    , Std.Dev.=       69.08356  |
| Fit:        R-squared=  .034946, Adjusted R-squared =          .01794  |
| Model test: F[  4,    227] =    2.05,    Prob value =          .08763  |
| Diagnostic: Log-L =  -1309.2599, Restricted(b=0) Log-L =   -1313.3862  |
|             LogAmemiyaPrCrt.=    8.492, Akaike Info. Crt.=     11.330  |
+------------------------------------------------------------------------+
+---------+-------------+----------------+--------+---------+----------+
|Variable | Coefficient | Standard Error |b/St.Er.|P[|Z|>z] | Mean of X|
+---------+-------------+----------------+--------+---------+----------+
 Constant  47.15868704      22.391245        2.106   .0352
 Q10       -6.633580945     4.1699402       -1.591   .1117  2.3922414
 Q8        -3.100921490     7.1624910        -.433   .6651  1.4698276
 Q18       -11.34893327     9.4334205       -1.203   .2290  1.7586207
 LOGINC     .9800118653     1.0576790         .927   .3542  6.5384546

Normal exit from iterations. Exit status=0.

              +---------------------------------------------+
              | Limited Dependent Variable Model - CENSORED |
              | Maximum Likelihood Estimates                |
              | Dependent variable                    Q14   |
              | Weighting variable                    ONE   |
              | Number of observations                232   |
              | Iterations completed                    5   |
              | Log likelihood function       -774.5432     |
              | Threshold values for the model:             |
              | Lower=     .0000     Upper=+infinity        |
              +---------------------------------------------+
+---------+-------------+----------------+--------+---------+----------
+|Variable | Coefficient | Standard Error |b/St.Er.|P[|Z|>z] | Mean of X|+---
------+-------------+----------------+--------+---------+----------+
         Primary Index Equation for Model
 Constant  118.5583893      37.803197        3.136   .0017
 Q10       -32.99916077     7.7976923       -4.232   .0000  2.3922414
 Q8        -36.56839497     13.717325       -2.666   .0077  1.4698276
 Q18       -20.42935005     15.226819       -1.342   .1797  1.7586207
 LOGINC     1.061848879     1.7459572         .608   .5431  6.5384546
        Disturbance standard deviation
 Sigma      96.40029769     6.2587164       15.403   .0000
```

McDonald and Moffitt Decomposition

```
--> NAMELIST         ; X = one,q8$
--> CREATE           ; Y = q14 $
--> TOBIT      ; Lhs = Y ; Rhs = X ; Par $
```

```
+------------------------------------------------------------------------+
| Limited Dependent Variable Model - CENSORED   Regression               |
| Ordinary    least squares regression    Weighting variable = none      |
| Dep. var. = Y         Mean=   13.18103448    , S.D.=   69.71172542     |
| Model size: Observations =     232, Parameters =   2, Deg.Fr.=    230  |
| Residuals:  Sum of squares= 1114553.202    , Std.Dev.=       69.61238  |
| Fit:        R-squared=  .007165, Adjusted R-squared =          .00285  |
| Model test: F[  1,    230] =    1.66,    Prob value =          .19892  |
| Diagnostic: Log-L =  -1312.5521, Restricted(b=0) Log-L =   -1313.3862  |
|             LogAmemiyaPrCrt.=    8.494, Akaike Info. Crt.=     11.332  |
+------------------------------------------------------------------------+
+---------+-------------+----------------+--------+---------+----------+
|Variable | Coefficient | Standard Error |b/St.Er.|P[|Z|>z] | Mean of X|
+---------+-------------+----------------+--------+---------+----------+
 Constant  25.12578305      10.336722        2.431   .0151
 Q8        -8.126632454     6.3078713       -1.288   .1976  1.4698276
```

```
Normal exit from iterations. Exit status=0.

              +--------------------------------------------+
              | Limited Dependent Variable Model - CENSORED |
              | Dependent variable                      Y   |
              | Weighting variable                    ONE   |
              | Number of observations                232   |
              | Iterations completed                    5   |
              | Estimation criterion           -787.2668    |
              | Threshold values for the model:             |
              | Lower=     .0000     Upper=+infinity        |
              +--------------------------------------------+
+---------+-------------+----------------+--------+---------+----------+
|Variable | Coefficient | Standard Error |b/St.Er.|P[|Z|>z] | Mean of X|
+---------+-------------+----------------+--------+---------+----------+
         Primary Index Equation for Model
 Constant  48.90742017      18.000834       2.717    .0066
 Q8       -59.14611678      13.008628      -4.547    .0000  1.4698276
        Disturbance standard deviation
 Sigma     100.0267279      6.5590859      15.250    .0000


--> CALC        ; K = COL(X) $
--> MATRIX      ; XB = Mean (X) ; beta = part(b,1,k) $
--> CALCULATE   ; sgma  = S
    ; bxs=dot(beta,xb)/sgma
    ; mu = n01(bxs)/phi(bxs)
    ; p=phi(bxs)
    ; p1=p*(1-bxs*mu-mu^2)
    ; p2=n01(bxs)*bxs+n01(bxs)*mu$
--> WALD        ; labels = b1,b2,V
    ; start=b
    ; Var = Varb
    ; fn1=phi(dot[Xb]/V)
    ; fn2= phi(dot[Xb]/V)
    * (1 - (dot[Xb]/V)*n01(dot[Xb]/V)/phi(dot[Xb]/V)
    - (n01(dot[Xb]/V)/phi(dot[Xb]/V))^2)
    ; fn3=   n01(dot[Xb]/V)  *((dot[Xb]/V)
    +  n01(dot[Xb]/V)/phi(dot[Xb]/V)) $

              +--------------------------------------------+
              | WALD procedure. Estimates and standard errors |
              | for nonlinear functions and joint test of  |
              | nonlinear restrictions.                    |
              | VC matrix for the functions is singular.   |
              | Standard errors are reported, but the      |
              | Wald statistic cannot be computed.         |
              +--------------------------------------------+
+---------+-------------+----------------+--------+---------+----------+
|Variable | Coefficient | Standard Error |b/St.Er.|P[|Z|>z] | Mean of X|
+---------+-------------+----------------+--------+---------+----------+
 Fncn( 1)   .3519095662      .29437127E-01   11.955    .0000
 Fncn( 2)   .1016021067      .13390327E-01    7.588    .0000
 Fncn( 3)   .2503074595      .16046801E-01   15.599    .0000

--> NAMELIST        ; X = one,q10$
--> CREATE          ; Y = q14 $
--> TOBIT       ; Lhs = Y ; Rhs = X ; Par $

+------------------------------------------------------------------------+
| Limited Dependent Variable Model - CENSORED   Regression               |
| Ordinary    least squares regression    Weighting variable = none      |
| Dep. var. = Y        Mean=   13.18103448    , S.D.=   69.71172542      |
| Model size: Observations =     232, Parameters =   2, Deg.Fr.=    230  |
| Residuals:  Sum of squares= 1097150.954    , Std.Dev.=       69.06679  |
| Fit:        R-squared=  .022667, Adjusted R-squared =          .01842  |
| Model test: F[  1,    230] =    5.33,    Prob value =          .02180  |
| Diagnostic: Log-L =  -1310.7266, Restricted(b=0) Log-L =   -1313.3862  |
|             LogAmemiyaPrCrt.=    8.479, Akaike Info. Crt.=     11.317  |
+------------------------------------------------------------------------+
+---------+-------------+----------------+--------+---------+----------+
|Variable | Coefficient | Standard Error |b/St.Er.|P[|Z|>z] | Mean of X|
+---------+-------------+----------------+--------+---------+----------+
 Constant  33.20147828      9.7827461       3.394    .0007
```

```
 Q10       -8.368906237       3.6235392       -2.310    .0209  2.3922414

Normal exit from iterations. Exit status=0.

              +---------------------------------------------+
              | Limited Dependent Variable Model - CENSORED |
              | Dependent variable                        Y |
              | Weighting variable                      ONE |
              | Number of observations                  232 |
              | Iterations completed                      5 |
              | Estimation criterion           -779.0720    |
              | Threshold values for the model:             |
              | Lower=     .0000     Upper=+infinity        |
              +---------------------------------------------+
+---------+-------------+----------------+--------+---------+----------+
|Variable | Coefficient | Standard Error |b/St.Er.|P[|Z|>z] | Mean of X|
+---------+-------------+----------------+--------+---------+----------+
         Primary Index Equation for Model
 Constant  61.57172564      16.122696        3.819    .0001
 Q10      -42.65783420      7.3256310       -5.823    .0000  2.3922414
        Disturbance standard deviation
 Sigma     97.38296482      6.3279794       15.389    .0000


--> CALC        ; K = COL(X) $
--> MATRIX      ; XB = Mean (X) ; beta = part(b,1,k) $
--> CALCULATE   ; sgma  = S
    ; bxs=dot(beta,xb)/sgma
    ; mu = n01(bxs)/phi(bxs)
    ; p=phi(bxs)
    ; p1=p*(1-bxs*mu-mu^2)
    ; p2=n01(bxs)*bxs+n01(bxs)*mu$
--> WALD        ; labels = b1,b2,V
    ; start=b
    ; Var = Varb
    ; fn1=phi(dot[Xb]/V)
    ; fn2= phi(dot[Xb]/V)
    * (1 - (dot[Xb]/V)*n01(dot[Xb]/V)/phi(dot[Xb]/V)
    - (n01(dot[Xb]/V)/phi(dot[Xb]/V))^2)
    ; fn3=   n01(dot[Xb]/V)  *((dot[Xb]/V)
    +  n01(dot[Xb]/V)/phi(dot[Xb]/V)) $

              +---------------------------------------------+
              | WALD procedure. Estimates and standard errors |
              | for nonlinear functions and joint test of   |
              | nonlinear restrictions.                     |
              | VC matrix for the functions is singular.    |
              | Standard errors are reported, but the       |
              | Wald statistic cannot be computed.          |
              +---------------------------------------------+
+---------+-------------+----------------+--------+---------+----------+
|Variable | Coefficient | Standard Error |b/St.Er.|P[|Z|>z] | Mean of X|
+---------+-------------+----------------+--------+---------+----------+
 Fncn( 1)   .3388372710      .29787741E-01   11.375    .0000
 Fncn( 2)   .9574477801E-01  .13145807E-01    7.283    .0000
 Fncn( 3)   .2430924930      .16641934E-01   14.607    .0000


NAMELIST        ; X = one,q10,q8,q18,loginc $
--> CREATE          ; Y = q14 $
--> TOBIT      ; Lhs = Y ; Rhs = X ; Par $

+-----------------------------------------------------------------------+
| Limited Dependent Variable Model - CENSORED   Regression              |
| Ordinary    least squares regression    Weighting variable = none     |
| Dep. var. = Y        Mean=   13.18103448    , S.D.=   69.71172542     |
| Model size: Observations =     232, Parameters =   5, Deg.Fr.=    227 |
| Residuals:  Sum of squares= 1083366.215    , Std.Dev.=       69.08356 |
| Fit:        R-squared=  .034946, Adjusted R-squared =          .01794 |
| Model test: F[  4,    227] =    2.05,    Prob value =          .08763 |
| Diagnostic: Log-L =  -1309.2599, Restricted(b=0) Log-L =   -1313.3862 |
|             LogAmemiyaPrCrt.=    8.492, Akaike Info. Crt.=     11.330 |
+-----------------------------------------------------------------------+
+---------+-------------+----------------+--------+---------+----------+
```

```
|Variable | Coefficient  | Standard Error |b/St.Er.|P[|Z|>z] | Mean of X|
+---------+--------------+----------------+--------+---------+----------+
 Constant  47.15868704      22.391245        2.106   .0352
 Q10      -6.633580945      4.1699402       -1.591   .1117  2.3922414
 Q8       -3.100921490      7.1624910        -.433   .6651  1.4698276
 Q18      -11.34893327      9.4334205       -1.203   .2290  1.7586207
 LOGINC    .9800118653      1.0576790         .927   .3542  6.5384546

Normal exit from iterations. Exit status=0.

             +--------------------------------------------+
             | Limited Dependent Variable Model - CENSORED |
             | Dependent variable                    Y    |
             | Weighting variable                  ONE    |
             | Number of observations              232    |
             | Iterations completed                  5    |
             | Estimation criterion          -774.5432    |
             | Threshold values for the model:            |
             | Lower=     .0000     Upper=+infinity       |
             +--------------------------------------------+
+---------+--------------+----------------+--------+---------+----------+
|Variable | Coefficient  | Standard Error |b/St.Er.|P[|Z|>z] | Mean of X|
+---------+--------------+----------------+--------+---------+----------+
         Primary Index Equation for Model
 Constant  118.5583893      37.803197        3.136   .0017
 Q10      -32.99916077      7.7976923       -4.232   .0000  2.3922414
 Q8       -36.56839497      13.717325       -2.666   .0077  1.4698276
 Q18      -20.42935005      15.226819       -1.342   .1797  1.7586207
 LOGINC    1.061848879      1.7459572         .608   .5431  6.5384546
        Disturbance standard deviation
 Sigma     96.40029769      6.2587164       15.403   .0000


--> CALC       ; K = COL(X) $
--> MATRIX     ; XB = Mean (X) ; beta = part(b,1,k) $
--> CALCULATE  ; sgma  = S
    ; bxs=dot(beta,xb)/sgma
    ; mu = n01(bxs)/phi(bxs)
    ; p=phi(bxs)
    ; p1=p*(1-bxs*mu-mu^2)
    ; p2=n01(bxs)*bxs+n01(bxs)*mu$
--> WALD       ; labels = b1,b2,b3,b4,b5,V
    ; start=b
    ; Var = Varb
    ; fn1=phi(dot[Xb]/V)
    ; fn2= phi(dot[Xb]/V)
    * (1 - (dot[Xb]/V)*n01(dot[Xb]/V)/phi(dot[Xb]/V)
    - (n01(dot[Xb]/V)/phi(dot[Xb]/V))^2)
    ; fn3=   n01(dot[Xb]/V)  *((dot[Xb]/V)
    +  n01(dot[Xb]/V)/phi(dot[Xb]/V)) $

             +--------------------------------------------+
             | WALD procedure. Estimates and standard errors |
             | for nonlinear functions and joint test of  |
             | nonlinear restrictions.                    |
             | VC matrix for the functions is singular.   |
             | Standard errors are reported, but the      |
             | Wald statistic cannot be computed.         |
             +--------------------------------------------+
+---------+--------------+----------------+--------+---------+----------+
|Variable | Coefficient  | Standard Error |b/St.Er.|P[|Z|>z] | Mean of X|
+---------+--------------+----------------+--------+---------+----------+
 Fncn( 1)   .3273383019      .30383200E-01   10.774   .0000
 Fncn( 2)   .9073749739E-01  .13053546E-01    6.951   .0000
 Fncn( 3)   .2366008045      .17329653E-01   13.653   .0000


--> PROBIT;Lhs=WTP;Rhs=one,age2,loginc,q8,educ2,q10;Hold results$
```

```
+----------------------------------------------------------------------+
| Dependent variable is binary, y=0 or y not equal 0                   |
| Ordinary    least squares regression    Weighting variable = none    |
| Dep. var. = WTP      Mean=    .5258620690    , S.D.=    .5004103407  |
| Model size: Observations =     232, Parameters =    6, Deg.Fr.=    226 |
| Residuals:  Sum of squares= 37.77933872    , Std.Dev.=          .40886 |
| Fit:        R-squared=  .346885, Adjusted R-squared =          .33244 |
| Model test: F[  5,    226] =   24.01,    Prob value =          .00000 |
| Diagnostic: Log-L =   -118.6566, Restricted(b=0) Log-L =    -168.0728 |
|             LogAmemiyaPrCrt.=   -1.763, Akaike Info. Crt.=      1.075 |
+----------------------------------------------------------------------+
+---------+-------------+----------------+--------+---------+----------+
|Variable | Coefficient | Standard Error |b/St.Er.|P[|Z|>z] | Mean of X|
+---------+-------------+----------------+--------+---------+----------+
 Constant  1.203929756      .10801552       11.146    .0000
 AGE2     -.2809422258E-02  .16126863E-02   -1.742    .0815  41.336207
 LOGINC   -.1072009035E-03  .61594539E-02    -.017    .9861  6.5384546
 Q8       -.2016065833      .42327928E-01   -4.763    .0000  1.4698276
 EDUC2     .4218744584E-01  .17792658E-01    2.371    .0177  1.6939655
 Q10      -.1406099996      .24911159E-01   -5.644    .0000  2.3922414

Normal exit from iterations. Exit status=0.

              +--------------------------------------------+
              | Binomial Probit Model                      |
              | Maximum Likelihood Estimates               |
              | Dependent variable                   WTP   |
              | Weighting variable                   ONE   |
              | Number of observations               232   |
              | Iterations completed                   5   |
              | Log likelihood function       -114.4691    |
              | Restricted log likelihood     -160.4997    |
              | Chi-squared                    92.06103    |
              | Degrees of freedom                     5   |
              | Significance level             .0000000    |
              | Results retained for SELECTION model.      |
              +--------------------------------------------+
+---------+-------------+----------------+--------+---------+----------+
|Variable | Coefficient | Standard Error |b/St.Er.|P[|Z|>z] | Mean of X|
+---------+-------------+----------------+--------+---------+----------+
         Index function for probability
 Constant  2.154908779      .38687736        5.570    .0000
 AGE2     -.8222669950E-02  .57189338E-02   -1.438    .1505  41.336207
 LOGINC   -.4699397215E-03  .21632137E-01    -.022    .9827  6.5384546
 Q8       -.6652472350      .15373549       -4.327    .0000  1.4698276
 EDUC2     .1438911283      .63912580E-01    2.251    .0244  1.6939655
 Q10      -.4377394525      .88440529E-01   -4.950    .0000  2.3922414


--> SELECT;Lhs =Q14;Rhs=one,loginc,q10,q8,q12$
          +-----------------------------------------------------------+
          | Sample Selection Model                                    |
          | Probit selection equation based on WTP                    |
          | Selection rule is: Observations with WTP      =  1        |
          | Results of selection:                                     |
          |                    Data points     Sum of weights         |
          | Data set                232              232.0            |
          | Selected sample         122              122.0            |
          +-----------------------------------------------------------+

+----------------------------------------------------------------------+
| Sample Selection Model                                               |
| Two stage   least squares regression    Weighting variable = none    |
| Dep. var. = Q14      Mean=   25.06557377    , S.D.=   94.74862242    |
| Model size: Observations =     122, Parameters =   6, Deg.Fr.=    116 |
| Residuals:  Sum of squares= 962163.5725    , Std.Dev.=       91.07422 |
| Fit:        R-squared=  .068421, Adjusted R-squared =          .02827 |
|             (Note:  Not using OLS.  R-squared is not bounded in [0,1] |
| Model test: F[  5,    116] =    1.70,    Prob value =          .13913 |
| Diagnostic: Log-L =   -720.4585, Restricted(b=0) Log-L =    -727.8582 |
|             LogAmemiyaPrCrt.=    9.071, Akaike Info. Crt.=     11.909 |
| Standard error corrected for selection.....   99.596                 |
| Correlation of disturbance in regression                             |
| and Selection Criterion (Rho).............    .58265                |
```

Variable	Coefficient	Standard Error	b/St.Er.	P[|Z|>z]	Mean of X
Constant	33.48334608	38.938720	.860	.3898	
LOGINC	1.913232601	2.0312031	.942	.3462	6.7089175
Q10	-20.44728153	19.777192	-1.034	.3012	1.7786885
Q8	-24.83331556	29.685467	-.837	.4028	1.1639344
Q12	12.25435047	5.6567990	2.166	.0303	1.0983607
LAMBDA	58.02980289	60.047728	.966	.3338	.52663469

INTERVAL DATA

```
--> logit;Lhs=protest2;Rhs=one,loginc,age2,q2,q10,q7e,q17hous$

            +---------------------------------------------+
            | Multinomial logit model                     |
            | There are  2 outcomes for LH variable PROTEST2 |
            | These are the OLS start values based on the |
            | binary variables for each outcome Y(i) = j. |
            | Coefficients for LHS=0 outcome are set to 0.0 |
            +---------------------------------------------+
+---------+-------------+----------------+--------+---------+----------+
|Variable | Coefficient | Standard Error |b/St.Er.|P[|Z|>z] | Mean of X|
+---------+-------------+----------------+--------+---------+----------+
         Characteristics in numerator of Prob[Y = 1]
 Constant  .2088409637      .12418198       1.682   .0926
 LOGINC   -.4409493655E-02  .40525202E-02  -1.088   .2766  7.1699693
 AGE2      .1370380340E-02  .15569727E-02    .880   .3788  43.811111
 Q2        .1329248868E-01  .14105216E-01    .942   .3460  1.8972222
 Q10       .6114405790E-02  .45495866E-02   1.344   .1790  2.4944444
 Q7E       .4020095737E-01  .19159114E-01   2.098   .0359  3.5944444
 Q17HOUS  -.3411330654E-01  .19885605E-01  -1.715   .0863  3.3388889

Normal exit from iterations. Exit status=0.

            +---------------------------------------------+
            | Multinomial Logit Model                     |
            | Maximum Likelihood Estimates                |
            | Dependent variable              PROTEST2    |
            | Weighting variable                   ONE    |
            | Number of observations               360    |
            | Iterations completed                   6    |
            | Log likelihood function         -215.9486   |
            | Restricted log likelihood       -222.3938   |
            | Chi-squared                      12.89049   |
            | Degrees of freedom                     6    |
            | Significance level            .4480824E-01  |
            +---------------------------------------------+
+---------+-------------+----------------+--------+---------+----------+
|Variable | Coefficient | Standard Error |b/St.Er.|P[|Z|>z] | Mean of X|
+---------+-------------+----------------+--------+---------+----------+
         Characteristics in numerator of Prob[Y = 1]
 Constant -1.337633598      .62567316      -2.138   .0325
 LOGINC   -.2740134720E-01  .24849784E-01  -1.103   .2702  7.1699693
 AGE2      .7003118542E-02  .75769476E-02    .924   .3553  43.811111
 Q2        .6083678377E-01  .66831118E-01    .910   .3627  1.8972222
 Q10       .4078376601E-01  .52086761E-01    .783   .4336  2.4944444
 Q7E       .1966466810      .95840012E-01   2.052   .0402  3.5944444
 Q17HOUS  -.1588895864      .95006466E-01  -1.672   .0944  3.3388889


--> probit;Lhs=protest2;Rhs=one,loginc,age2,q2,q10,q7e,q17hous$

+------------------------------------------------------------------------+
| Dependent variable is binary, y=0 or y not equal 0                     |
| Ordinary    least squares regression    Weighting variable = none      |
| Dep. var. = PROTEST2 Mean=    .3083333333    , S.D.=    .4624477686    |
| Model size: Observations =     360, Parameters =    7, Deg.Fr.=     353 |
| Residuals:  Sum of squares= 74.11417377    , Std.Dev.=          .45821 |
| Fit:        R-squared=  .034657, Adjusted R-squared =          .01825 |
| Model test: F[  6,    353] =    2.11,    Prob value =          .05130 |
| Diagnostic: Log-L =   -226.3284, Restricted(b=0) Log-L =    -232.6774 |
|             LogAmemiyaPrCrt.=   -1.542, Akaike Info. Crt.=      1.296 |
+------------------------------------------------------------------------+
+---------+-------------+----------------+--------+---------+----------+
|Variable | Coefficient | Standard Error |b/St.Er.|P[|Z|>z] | Mean of X|
+---------+-------------+----------------+--------+---------+----------+
 Constant  .2088409637      .12418198       1.682   .0926
 LOGINC   -.4409493655E-02  .40525202E-02  -1.088   .2766  7.1699693
 AGE2      .1370380340E-02  .15569727E-02    .880   .3788  43.811111
 Q2        .1329248868E-01  .14105216E-01    .942   .3460  1.8972222
 Q10       .6114405790E-02  .45495866E-02   1.344   .1790  2.4944444
 Q7E       .4020095737E-01  .19159114E-01   2.098   .0359  3.5944444
```

```
 Q17HOUS  -.3411330654E-01  .19885605E-01   -1.715   .0863  3.3388889

Normal exit from iterations. Exit status=0.

              +--------------------------------------------+
              | Binomial Probit Model                      |
              | Maximum Likelihood Estimates               |
              | Dependent variable              PROTEST2   |
              | Weighting variable                   ONE   |
              | Number of observations               360   |
              | Iterations completed                   6   |
              | Log likelihood function         -215.9572  |
              | Restricted log likelihood       -222.3938  |
              | Chi-squared                      12.87316  |
              | Degrees of freedom                     6   |
              | Significance level             .4509500E-01|
              +--------------------------------------------+
+---------+-------------+----------------+--------+---------+----------+
|Variable | Coefficient | Standard Error |b/St.Er.|P[|Z|>z] | Mean of X|
+---------+-------------+----------------+--------+---------+----------+
         Index function for probability
 Constant -.8028294608      .37006316      -2.169    .0300
 LOGINC   -.1684691625E-01  .14885143E-01  -1.132    .2577   7.1699693
 AGE2      .4057983381E-02  .45629417E-02    .889    .3738   43.811111
 Q2        .3602223844E-01  .40673706E-01    .886    .3758   1.8972222
 Q10       .2394889768E-01  .27987391E-01    .856    .3922   2.4944444
 Q7E       .1182543115      .57163640E-01   2.069    .0386   3.5944444
 Q17HOUS  -.9576823170E-01  .57637236E-01  -1.662    .0966   3.3388889

Total     356    4  |    360


--> grouped data;
    lhs=q12a;
    rhs=one,loginc,q18,educ,q10,q8,q17hous;
    limits=6,11,21,31,41,51$

+-----------------------------------------------------------------------+
| Limited Dependent Variable Model - CENSORED   Regression              |
| Ordinary    least squares regression    Weighting variable = none     |
| Dep. var. = Q12A     Mean=   10.07000000    , S.D.=   9.235870572     |
| Model size: Observations =     250, Parameters =   7, Deg.Fr.=    243 |
| Residuals:  Sum of squares= 19237.62951    , Std.Dev.=        8.89760 |
| Fit:        R-squared=  .094275, Adjusted R-squared =         .07191 |
| Model test: F[  6,    243] =    4.22,    Prob value =          .00047 |
| Diagnostic: Log-L =   -897.6300, Restricted(b=0) Log-L =    -910.0074 |
|             LogAmemiyaPrCrt.=    4.399, Akaike Info. Crt.=      7.237 |
+-----------------------------------------------------------------------+
+---------+-------------+----------------+--------+---------+----------+
|Variable | Coefficient | Standard Error |b/St.Er.|P[|Z|>z] | Mean of X|
+---------+-------------+----------------+--------+---------+----------+
 Constant  19.77255905      3.9609269        4.992    .0000
 LOGINC   -.1793832623      .87991840E-01   -2.039    .0415   7.4251181
 Q18      -3.812898095      1.4947621       -2.551    .0107   1.8360000
 EDUC      .6799003360E-02  .40777435         .017    .9867   1.4480000
 Q10      -1.007993328      .52052693       -1.936    .0528   2.2080000
 Q8       -1.879706134      1.0045041       -1.871    .0613   1.2880000
 Q17HOUS   .9608028174      .46924444        2.048    .0406   3.4000000

Normal exit from iterations. Exit status=0.

             +--------------------------------------------+
             | Limited Dependent Variable Model - CENSORED|
             | Maximum Likelihood Estimates               |
             | Dependent variable                  Q12A   |
             | Weighting variable                   ONE   |
             | Number of observations               250   |
             | Iterations completed                   6   |
             | Log likelihood function         -281.4601  |
             | Censoring Thresholds for the  7 cells:     |
             |      Lower   Upper     Lower    Upper      |
             |  1 *******    6.00  2    6.00   11.00      |
```

```
|  3   11.00   21.00  4   21.00   31.00      |
|  5   31.00   41.00  6   41.00   51.00      |
|  7   51.00 *******                         |
+---------------------------------------------+
+---------+-------------+----------------+--------+---------+----------+
|Variable | Coefficient | Standard Error |b/St.Er.|P[|Z|>z] | Mean of X|
+---------+-------------+----------------+--------+---------+----------+
         Primary Index Equation for Model
 Constant  28.57925284      8.7687818        3.259   .0011
 LOGINC   -.7537326824      .31584027       -2.386   .0170  7.4251181
 Q18      -9.938083483      3.2215915       -3.085   .0020  1.8360000
 EDUC      .4983720549E-01  .92876695         .054   .9572  1.4480000
 Q10      -3.619671847      1.3792641       -2.624   .0087  2.2080000
 Q8       -10.09878230      3.3240050       -3.038   .0024  1.2880000
 Q17HOUS   3.955465835      1.2273843        3.223   .0013  3.4000000
         Disturbance standard deviation
 Sigma     16.72788159      1.3837853       12.088   .0000
```

```
--> grouped data;
    lhs=q12a,wtp;
    rh1=one,loginc,q18,educ,q8,q17hous;
    rh2=one,q8,q10;
    limits=6,11,21,31,41,51$
```

```
+-----------------------------------------------------------------------+
| OLS Estimates for GROUPED DATA with selection model                   |
| Ordinary    least squares regression    Weighting variable = none     |
| Dep. var. = Q12A     Mean=   10.07000000    , S.D.=   9.235870572     |
| Model size: Observations =     250, Parameters =   9, Deg.Fr.=    241 |
| Residuals:  Sum of squares= 18815.34055    , Std.Dev.=        8.83583 |
| Fit:        R-squared=  .103129, Adjusted R-squared =         .07336 |
| Model test: F[  8,    241] =    3.46,    Prob value =          .00084 |
| Diagnostic: Log-L =   -894.8555, Restricted(b=0) Log-L =    -910.0074 |
|             LogAmemiyaPrCrt.=    4.393, Akaike Info. Crt.=      7.231 |
| Sample selection based on WTP      =1.                                |
| Coefficients for probit/selection part begin with ONE                 |
+-----------------------------------------------------------------------+
+---------+-------------+----------------+--------+---------+----------+
|Variable | Coefficient | Standard Error |b/St.Er.|P[|Z|>z] | Mean of X|
+---------+-------------+----------------+--------+---------+----------+
 Constant  18.22149323      3.8521702        4.730   .0000
 LOGINC   -.1729084660      .87317946E-01   -1.980   .0477  7.4251181
 Q18      -3.896344905      1.4837695       -2.626   .0086  1.8360000
 EDUC      .1122866985      .40131430         .280   .7796  1.4480000
 Q8       -2.601179370      .92638126       -2.808   .0050  1.2880000
 Q17HOUS   1.021702848      .46493953        2.197   .0280  3.4000000
 Constant  1.082592252      .41448012        2.612   .0090
 Q8         .1879109471     .28480194         .660   .5094  1.2880000
 Q10      -.2430351229      .14593964       -1.665   .0959  2.2080000

Normal exit from iterations. Exit status=0.

+---------------------------------------------+
| GROUPED data with sample selection          |
| Maximum Likelihood Estimates                |
| Dependent variable                  Q12A    |
| Weighting variable                  ONE     |
| Number of observations              250     |
| Iterations completed                17      |
| Log likelihood function       -380.9858     |
| Sample selection based on WTP      =1.      |
| Coeffs. for selection part begin with ONE   |
| Grouped data appear in  7 cells:            |
| Cell  Lower    Upper  Cell   Lower    Upper |
|  1 ********     6.0    2      6.0     11.0 |
|  3     11.0    21.0    4     21.0     31.0 |
|  5     31.0    41.0    6     41.0     51.0 |
|  7     51.0 ********   8 ********       .0 |
+---------------------------------------------+
+---------+-------------+----------------+--------+---------+----------+
|Variable | Coefficient | Standard Error |b/St.Er.|P[|Z|>z] | Mean of X|
+---------+-------------+----------------+--------+---------+----------+
```

	RHS for Grouped Data Regression Model				
Constant	22.77865186	10.461987	2.177	.0295	
LOGINC	-.8218974987	.35642509	-2.306	.0211	7.4251181
Q18	-7.481619040	3.9208270	-1.908	.0564	1.8360000
EDUC	-.1152865728	1.0608655	-.109	.9135	1.4480000
Q8	-5.937997955	6.1087403	-.972	.3310	1.2880000
Q17HOUS	3.119355317	1.3881587	2.247	.0246	3.4000000
	Selection Equation				
Constant	1.988923407	.22519470	8.832	.0000	
Q8	-.5319993022	.13726297	-3.876	.0001	1.2880000
Q10	-.4193566009	.74354756E-01	-5.640	.0000	2.2080000
Sigma	15.31267065	1.0307786	14.855	.0000	
Rho	-.9093867819E-01	.41207340	-.221	.8253	

Appendix 3

Summary of witness presentations at the citizens' jury

WILLIE McGHEE, Borders Forest Trust

Background to the Borders Forest Trust: The Borders has the least native woodland in the UK, and yet currently has the most activity related to native woodlands. In recent years a variety of sources of money have come about to finance the increase in native woodland in the UK, such as Millennium Forest money. Borders Forest Trust was set up to try and obtain some of this money for work on native woodlands in the Borders. BFT is a charitable trust of about 150 members.

Background to the Ettrick Floodplain Restoration Project: Various projects are under the umbrella of the BFT such as the woodschool, various native woodland projects, and the Ettrick Floodplain Project. The Ettrick Project involves the BFT with a number of partners including the World Wide Fund For Nature (WWF) and aims to restore an area of floodplain along a stretch of the Ettrick Water. The Ettrick Project acquired Objective 5b money (from the EU) and is in partnership with the local community. The project is steered by two groups, the local steering group and the technical steering group, which influence the direction of the project.

Background to the Southern Uplands Initiative: The aim of the Southern Uplands Initiative is to put small projects like the Ettrick Project into a wider context and to get a range of different agencies to work together in Southern Scotland on environmental and land use issues. The sorts of things the SUI can deal with are: conflict resolution for example, in the case of quarrying; organisation of lobbying of the Scottish Parliament; demonstrating best practice with respect to how farming, the economy, forestry and the environment can work together.

PIP TABOR, Scottish Natural Heritage

Background to the Natural History of the Borders: The Borders was probably almost completely wooded until 5-6,000 years ago. At this time there would have been aurochs, elk and deer grazing in the woods and wild boar stirring up the woodland floor. Wolves and beavers would

also have been obvious. The "wildwood" would have been tangled and dense with up to 60% of the trees dead or dying at any one time, providing habitat for a wide range of invertebrates, mammals, birds, fungi and plants. This dead wood habitat is now one of the most scarce in the Borders.

From around 4,000 years ago, man started to make a real impact on the Borders landscape. Since then man has cleared all the original woodland excepting some tiny remnants which have persisted on cliffs, in deep cleuchs or screes or steep river banks where they have escaped the fires, axes and domestic stock of Homo Sapiens. What can be seen in the Borders today is largely the result of plantings that have taken place since the 1700s. Only about 0.25% of the Borders shows any signs of continuous woodland cover. This is amongst the lowest for any part of Britain.

The mix of woods, fields, hedgerows, dykes and open hills is the result of centuries of interaction between man and the land. The main impacts on the land today are agriculture, forestry, development, conservation, global influences.

There is a greater awareness today of the risks we take if we abuse environmental resources. There is a strong call for practices to be "sustainable". SNH has this within its remit. SNH is charged to encourage others to use the environment in a way that is sustainable. This awareness had led to the Rio Summit and the subsequent Local Agenda A21 process, to the production of biodiversity action plans for species and habitats, the requirement for local authorities to produce Local Biodiversity Action Plans, and more widely the concern for the environment and the interest in recreating woodlands (Millennium Forest, BFT and the Wildwood project).

ALEX MORRIS, Conservator, Forestry Commission, Lothian & Borders Conservancy

Potential Benefits to Forestry of the Southern Uplands Initiative

- Strategies which take account of east/west cultural links in South Scotland

- Engagement of the wider community in forestry strategies and policy development
- Engagement of the wider community in forestry problem solving and decision making
- Increasing the profile of the benefits of forestry to the economy of South Scotland
- Attracting inward investment to forestry and related businesses in South Scotland
- Attracting European Funding for forestry and related businesses in South Scotland
- Securing an appropriate share of Scottish Parliament funding to forestry in South Scotland

Potential Environmental and Social Benefits of the Southern Uplands Initiative

- Consensus on land use balance issues
- Integrated woodland and related habitat network development across South Scotland
- Integrated species plan development across South Scotland e.g. Red Squirrels
- Optimise forestry and related job opportunities in South Scotland
- Increase recreational opportunities and tourism income through a network of access opportunities across South Scotland

Potential Benefits to the Forestry Commission of the Southern Uplands Initiative

- Better mechanisms for delivering our Corporate and Business Plans in order to meet the Forestry Commission Objectives, i.e. Protect and expand Britain's forests and woodlands and increase their value to society and the environment.

DEREK LAWSON, Planning Dept, Scottish Borders Council

Southern Uplands Initiative - Reservations and Concerns

- Sledgehammer to crack a nut?
- 'Just another Talking Shop'?
- How much will it cost?

MARION OATES, Scottish Borders Tourist Board

Value of Tourism to the Rural Economy

- Tourism is worth £79m in direct earning to the Borders
- It provides jobs for 3,500 people - 8% of working population
- Majority of businesses small with owner/manager
- Over 66% of revenue is invested back into the local area

Who are these Tourists?

- ABC1, 45+, couples
- Spend average 4 nights in the area and make several repeat visits
- Come because of the landscape and environment
- Enjoy walking and visiting historic sites
- Growing interest in walking, cycling, riding, countryside pursuits and wildlife

Tourism in the Year 2005

- Joint Borders wide strategy
- Focus on quality rather than quantity
- Experience which will exceed visitor's expectations all year round
- Focused on Landscape - activities/wildlife/niche markets

Southern Uplands Initiative

- Understand the value and importance of tourism to rural economy
- Support Joint Tourism Strategy
- Support introduction and maintenance of facilities, e.g. footpaths, bridleways, based on Borders Access Strategy
- Encourage co-ordinated activities which are sustainable environmentally and economically and are visitor focused

IAN LAIDLAW, Operations Manager, Forestry Commission

What is the Forestry Authority (Forestry Commission)?

- Statutory authority which aims to protect and expand Scotland's forests and woodlands and increase their value to society and the environment.

How the FA Contributes to Ettrick Floodplain Restoration Project (And Others Like It):

- Grants to owners (except FE) for e.g. woodland planting/natural regeneration and management grants for biodiversity, public access and reduced grazing

- Advice through the Technical Steering Group
- Long-term monitoring to ensure survival of new and regenerated woodlands
- Issue felling licences (with restocking conditions)

FA Objectives at Ettrick:

- Protect and improve existing woodlands particularly native woods in the area (e.g. protection from grazing)
- Expand woodland area (appropriate sites and design) by planting or natural regeneration
- Contribute to biodiversity action plans (habitats and species) e.g. wet woodlands and red squirrels
- Improve the design and management of the wider (predominantly conifer) forest
- Appropriate public access
- Landscape improvements
- Public understanding of woodlands and forestry
- Community involvement in forestry
- Restocking of felled woodland

Other Benefits

- Partnership - access to external funds, e.g. EU (objective 5b) and lottery
- Partnership - more action on the ground (through joint efforts of public, private and voluntary sectors)

- Partnership - better understanding/integration/co-ordination of different land uses and views
- Jobs e.g. harvesting conifers, fencing, planting, habitat management, recreation, tourism
- Shelter for farm stock
- Economy of scale e.g. deer management
- Publicity

Concerns

- Time required, especially evenings and weekends
- Failure to satisfy everyone's aspirations/concerns e.g. public access

ANDREW McBRIDE, McBride Habitats - Manager of the Ettrick Site

Background to the Ettrick Floodplain Restoration Project: Floodplain forest habitats have almost disappeared from Britain and survive in very few parts of Scotland. In 1995 the World Wildlife Fund for Scotland responded to concerns about floodplain forest habitat by commissioning a review of the status of floodplain forest in Scotland. One of the best developed areas of floodplain habitat identified, with the greatest potential for expansion was on the haughland of the Upper Ettrick, in the Scottish Borders.

The Site: The Upper Ettrick site contains a reservoir of native woodland and its associated biodiversity. The 4 km stretch of floodplain alongside the Upper Ettrick and Tima Water has a very high conservation value, with willow scrub wet grasslands, swamps and meadows. These habitats form an intimate mosaic of vegetation types, with a large range in the vertical height, acidity and wet and dry conditions. Adjacent land uses include plantation forestry, estate tree planting, semi-intensive agriculture and tourism.

The People: In partnership with The Millennium Forest for Scotland, Forest Enterprise, World Wildlife Fund for Scotland and local landowners the Borders Forest Trust is co-ordinating a project which will expand the floodplain site in the Upper Ettrick, creating an area of national and international quality. Two steering groups have been set up to proceed with an informed and united approach to delivering the project. The Community Group are drawn from the valley and have a wide range of interests. The comments on all aspects of the project are considered in the planning and implementation of the wide range of facets contained in the project, e.g. path way, brash burning and car parking. The Technical Group comprise of a wide range of local bodies and agencies who advise and give their views on the technical aspects of the project.

Objectives: The Ettrick Floodplain Restoration project aims to achieve the following outputs:

- The creation of 25 hectares of new native woodland.
- The creation of 3 km of footpaths, boardwalks and tracks.
- Restoration of 30 hectares of floodplain habitat, including scrub, fen, hay meadows and wetlands.
- Management of 15 hectares of scrub willow.
- Conversion of 30 hectares of conifer plantation to native broadleaves.

The site will also act as a demonstration for other restoration projects and provide educational and research opportunities for schools, colleges and environmentalists. The purpose of the project is to enhance the environment of the Upper Ettrick valley and promote the conservation of Scotland's species.

DAVID GREEN, Ettrick Community, Midgehope Farm

A perception of the likely impacts of the project: There is a diversity of opinion within the local community with respect to the likely impacts of the wetland project. David could only speak with confidence on his own view of the matter and it would be necessary to speak to a number of people to determine the true range of opinion. This having been said it is his understanding that the majority of the local residents in Ettrick are very positive about the project. Even most of those with reservations about the project have these out of concern for the well being of the valley.

Positive Impacts

- Will act as a deterrent to further blanket afforestation in the upper Ettrick.
- Will stop further degradation of the wetland area and will reverse some of the decline e.g. blanket planting of Sitka spruce to the edge of the river which was dying back, fly tipping on the edge of the wetland adjacent to the road.
- Will encourage sensitive management of the existing forests in the area.
- Will help retain the sense of wildness.
- Will secure a haven for wildlife.
- Will provide a small income to local farmers through becoming involved in environmental projects. This will contribute towards sustaining traditional land use which is coming increasingly under threat.
- Will bring additional small numbers of visitors to the area which will provide extra income to local farmers through provision of accommodation, etc.

- Will help sustain local community including local school, church and post office.

- Will help sustain local enterprises i.e., hotel and pub, 2 large and 1 small caravan sites and a post office.

- Will continue as a retreat for visitors from urban areas providing space, peace and quiet, freedom to play without disturbance, a more natural environment and the feeling of wildness.

Negative Impacts

- A danger that over provision of infrastructure may spoil some of the qualities that the project seeks to protect.

- A possible loss of anonymity may detract from the qualities of Ettrick Valley.

- Privacy may be compromised.

PETRA BIRENBACH, Local Agenda 21 Development Officer from Scottish Borders Council

The work of the Citizens' Jury can be seen in the wider context of Local Agenda 21 (LA21). LA21 implies that there should be more public involvement and consultation in environmental issues. The earth's resources and management of these resources have to fit within the management of social welfare, health and economic welfare of society. That is, natural and man made systems must be managed sustainably. In order for all these issues to be considered and managed in a sustainable manner, the participation of the public is vital. Consultation and participation exercises such as Citizens' Juries were useful in determining what the public wanted and in responding to the requirement for more public involvement in the decision making process as agreed under LA21.

Appendix 4

Valuation workshop questionnaire

BORDERS QUESTIONNAIRE – PART 1

The Scottish Agricultural College and the University of Edinburgh are conducting some research on management of the countryside in Scotland. Please answer the following questions about your attitude towards the countryside in the Borders Region of Scotland?

Q1.

Do you participate in any outdoor activities?

	Please tick	Next
Yes		Go to Q2
No		Go to Q3

Q2.

Which of the following activities do you participate in?

	Please tick
(Hill) walking	
Field sports	
Caravaning	
Camping	
Gardening	
Cycling	
Fishing	
Watching wildlife	
None	
Other (specify) _____	

Q3.

How long have you lived in the Borders?

	Please tick
Less than 2 years	
3 – 5 years	
6 – 10 years	
11 – 15 years	
16 – 20 years	
More than 20 years	

Q4.

How would you describe the physical environment in which you were brought up?

	Please tick
Near the centre of a town	
On the outskirts of a town	
Near the centre of a city	
On the outskirts of a city	
In the countryside, but close to a town/city	
In the countryside a long way from a town or a city	

Q5.

How would you describe the physical

	Please tick
Near the centre of a town	

environment in which you live now?		
	On the outskirts of a town	
	Near the centre of a city	
	On the outskirts of a city	
	In the countryside, but close to a town/city	
	In the countryside a long way from a town or a city	

Q6. Please indicate how strongly you agree or disagree with the following statements by ticking one box for each statement.

	Agree strongly	Agree slightly	Neither / Nor	Disagree slightly	Disagree strongly
The balance of nature is very delicate and easily upset by human activities					
The earth is a planet with only limited room and resources					
Plants and animals do not exist primarily for human use					
Modifying the environment for human use seldom causes serious problems					
There are no limits to growth for nations like the UK					
Humankind was created to rule over the rest of nature					

We would like you to think about a specific project in the Ettrick Valley. The project aims to restore the area shown on the map to its natural state - a forest floodplain (Showcard 1). Floodplain forest habitats are among the richest ecological systems, but most have now disappeared from Britain. Protection and expansion of this area would ensure the survival of this ecological system and protect many species of bird, plant and animal.

Currently much of the area is covered with conifer plantation, and rough grazing for sheep and cattle. Although these types of natural habitat would still be found widely throughout the region, the project would create a 150 hectare area (equivalent to about 230 football pitches) consisting of a number of different habitats such as wooded wetland, wetland, deciduous woodland, and haymeadow along a stretch of the Upper Ettrick (Showcard 2).

The chart on Showcard 3 shows which natural habitats are present in the area now, and what will be there if the project goes ahead. The project would not change the types of land use in areas outside the project site, and would go ahead with the consent of the affected farmers.

The change in the type of natural habitat which the project would promote would ensure that certain rare species such as otter, are protected, and may also encourage new species, such as osprey, to the area. Access to all of the natural habitat created by the Ettrick floodplain project would be open to everyone.

Q7.

	Please tick	Next
Do you prefer the site with or without the project?		
With		Go to Q8
Without		Go to Q8
Don't know		Go to Q9

Q8. Can you say why you prefer that option?

_____

_____

Go to Q9

Q9.

If the project went ahead, how likely would you be to visit the Ettrick Valley?

	Please tick
Very likely	
Quite likely	
Not very likely	
Not at all likely	
Unsure	

Q10.

Have you visited the Ettrick Valley in the last year?

	Please tick	**Next**
Yes		Go to Q11
No		Go to Q12
Don't know		Go to Q12

Q11.

How many times have you visited in the last year?

	Please tick
Once	
2 – 3 times	
4 – 5 times	
6 – 10 times	
More than 10 times	

Q12. Some of the money to pay for the project may be available through European and government funding, but if the project is to go ahead, a large amount must be raised by donations from the public. Unless sufficient funds could be raised by public donation, the project would not go ahead. This money could be raised by setting up a community trust fund which would help pay for the management of the site. If a fund were set up to raise money for this project, would you be willing to make a donation into it?

	Please tick	**Next**
Yes		Go to Q13
No		Go to Q14
Don't know		Go to Q15

Q13. What is the maximum amount of money that your household would be willing to donate (on a once only basis) to the fund in order to ensure this project went ahead? Please bear in mind that this money would only go towards paying for management of the natural environment in the Ettrick valley. You might also like to think about the spending on other items you might have to give up if you did make this payment.

£_____

Go to Q15

Q14.

Why would you not be willing to make a contribution?

	Please tick
Cannot afford to	
I would rather give to other charities	
I do not like the project/environment	
I would not visit the area	
Some other body should be responsible for paying	
Other (specify)	

Q15. If enough money were raised from public donation for the project to go ahead, there are a number of habitat types that these funds could be used to improve. We would like to know which natural habitats you think the money should be spent on. If you were given 100 tokens to distribute amongst the natural habitats shown in the pictures, how would you allocate these tokens between them? For example, if you prefer grazing fields and conifer plantations to the other natural habitats you might allocate more tokens to them, say 30 each. You might quite like deciduous woodland and allocate 20 tokens to them, you may not like wetland or wooded wetland very much and allocate only 10 tokens to those habitats. You may not like haymeadow at all and therefore allocate no tokens to that natural habitat (Showcard 2 shows you pictures of each of these habitats). Please allocate your 100 tokens in the boxes below.

	Number of Tokens
Grazing fields	
Conifer plantation	
Deciduous woodland	

	Number of Tokens
Wetland	
Wooded wetland	
Haymeadow	

Q16. Here is a list of countryside issues which concern people living in the Borders. I would like you to **rank** their importance, where 1 is most important, the next most important is number 2, and so on. You should give the issue you think is least important, number 5.

	Rank with a number
Pollution / pesticides	
Housing	
Transport	
Protecting wildlife	
Protecting rural jobs	

Q17. Are you a member of any environmental or community groups, such as the RSPB, Friends of the Earth or the local community council, or any similar organisation?

	Please tick
Yes	
No	

Q18. **ONLY ANSWER THIS QUESTION IF YOU ANSWERED "yes" TO Q12, otherwise please answer the questions on the next page.**

You said earlier that your household would be willing to pay into a community trust fund to help pay for the project in the Ettrick Valley. Can you say how you decided upon that figure?

_____

_____

Q19.

If you were asked to donate that amount tomorrow, would you do so?

	Please tick	Next
Yes		Next page
No		Go to Q20

Q20. Can you say why not?

_____

_____

Age

Under 25	
25 - 34	
35 – 44	
45 – 54	
55 – 64	
65 +	

Household Income

Less than £5000	
£5001 - £10000	
£10001 - £15000	
£15001 - £20000	
£20001 - £25000	
£25001 - £30000	
£30001 - £40000	
More than £40000	

Education Level

'O' level / 'O' grade	
Higher level	
Certificate / Diploma	
Degree	
Post graduate degree	
Other_____	

Gender

Male	
Female	

Occupation

_____

Thank you. Please help yourself to a cup of coffee.

PART 2

Q21. In Question 13 you were asked what maximum amount you would be willing to pay into a community trust fund to ensure that the Ettrick Project went ahead. Following the discussion you have just had in your group, would you like to change your answer?

	Please tick	Next
Yes		Go to Q22
No		Go to Q24

Q22. What amount would you like to change your donation to?

£_____

Go to Q23

Q23. Please tell us what has made you change your answer.

_____

_____

_____

_____

Finish

Q24. Please tell us why you have not changed your answer.

_____

_____

_____

_____

Finish

Thank you for completing the questionnaire